TENDER NOTICE No. BSPCB/LAB/INSTRUMENTS/2012-13/1/49 Dt. 31.01.2013

TENDER DOCUMENT

FOR

SUPPLY

OF
LABORATORY INSTRUMENTS/EQUIPMENTS

BIHAR STATE POLLUTION CONTROL BOARD
BELTRON Bhawan, Shastri Nagar, Patna-800 023
EPABX - 0612-2281250/2282265, Fax - 0612-2281050
Website.bspcb.bih.nic.in

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Schedule of Tender

TENDER DOCUMENT FOR THE SUPPLY OF LABORATORY INSTRUMENTS/ EQUIPMENTS

PRICE OF TENDER DOCUMENT: Rs, 10,000=00

Last date & time for sale of Tenders	:	**25.02.2013** up to 11.00 A.M.
Last Date of Submission of Tender	:	**25.02.2013** up to 02.00 P.M.
Date of opening of Tenders	:	**25.02.2013** at 03.30 P.M.
Date of Sale of Tenders	:	From **01.02.2013** to **25.02.2013 up to 11.00 A.M.**

Member Secretary

BIHAR STATE POLLUTION CONTROL BOARD

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TENDER NOTICE

No. BSPCB/LAB/INSTUMENTS/2012-13/1/49 **Dt. 31.01.13**

TENDER NOTICE FOR THE SUPPLY OF LABORATORY INSTRUMENTS/EQUIPMENTS

1. Bihar State Pollution Control Board, Patna invites sealed tenders in two bid form (Technical & Financial) separately from reputed manufacturer/authorized dealers in India and abroad for supply of laboratory instruments/equipments indicated below as per technical specifications specified in bidding documents.

2. A complete set of tender documents may be purchased by interested eligible bidders from **01.02.2013** to **25.02.2013 up to 11.00 A.M**. on submission of a written application with a non-refundable Bank-draft of Rs. 10,000/-(Rupees Ten Thousand) only towards cost of Tender Document in favour of "Bihar State Pollution Control Board" payable at Patna.

   The same can also be downloaded from Board's website http://bspcb.bih.nic.in. In this case bid shall be accompanied along with a demand draft Rs. 10,000=00 as cost of tender document.

3. Tenders (technical & financial) must be submitted in two separate envelopes on or before 2.00 P.M on **25.02.2013** at "Bihar State Pollution Control Board" Beltron Bhawan, Shastrinagar, Patna-800 023. Techno-commercial bids will be opened on the same day i.e. **25.02.2013 at 3.00 P.M** in the presence of bidders or their authorized representatives. Who would like to be present? The date of opening of financial bid will be communicated latter on to the successful bidders whose techno commercial bid is found suitable by the Board.

4. All the tenders must be accompanied by bid security in accordance with the instructions given in bidding document.

5. Bihar State Pollution Control Board reserves the right to reject any or all the bids without assigning any reason whatsoever.

6. In the event of date being declared as holiday, the date for submission and opening of bids shall be the following working day of the appointed date and time.

7. Terms and Conditions: As detailed in bidding documents.

8. List of laboratory instruments/equipments to be supplied;

pH Meter (Digital)Bench Top (4),Turbidity Meter (Bench Top Model) (6), Conductivity Meter (Bench Top Model) (6), Analytical Balance (2), Ion Analyser (4), Water Bath (Thermostatic) (4), UV-Visible Spectrophotometer (PC Controlled) 2, COD Refluxer with Air Condensers (4), Autoclave (6), Bacteriological Incubator (2), Hot Air Oven (4), Hot Plate (3), Magnetic Stirrer with Hot Plate (4), Flame photometer (Digital) (3), Digital Colony Counter (Electronic) (4), Heating Mantle 1 KW (3) and 0.50 KW(3), U.P.S. 7 KVA (1), Combustion Gas Analyser (Flue gas Analyzer) (1), BOD Incubator (3), Microwave Digester (1), Muffle Furnace (4), Ambient CO Analyser(1), Ambient SO_2 Analyser (1), Ambient NO_X (NO-NO_2-NO_X) Analyser (1), Ambient Ozone (O_3) Analyser (1), Automatic Multi calibration system for Ambient gas Analyzer with Span gas and other accessories(1), Atomic Absorption Spectrophotometer (1). Mercury Analyser (1), CO/HC Analyser (1), Smoke Density Meter (1) and Micro processor Controlled Specific Colorimeter (1),

Member Secretary

PART-A

General
Terms and Conditions
Of
Tender

TENDER NOTICE

No.BSPCB/**LAB/INSTUMENTS/2012-13/1/49** **Dt.31.01.13**

TENDER NOTICE FOR THE SUPPLY OF LABORATORY INSTRUMENTS/EQUIPMENTS

1. Bihar State Pollution Control Board, Patna invites sealed tenders in two bid form(Technical & Financial) separately from reputed manufacturer/authorized dealers in India and abroad for supply of laboratory instruments /equipments as per technical specifications specified in bidding documents.
2. The details of tender notice, eligibility of bidder, instructions to bidders, scope of work, bidding procedure and terms & conditions are available in the bidding document. Bidding document may be downloaded from (http://bspcb.bih.nic.in. The schedule of bidding are hereunder;

1	Sale / issue of BOQ/bidding document	From 01.02.2013 to 25.02.2013 upto 11.00 a.m.
2	Receipt of bids	Upto 25.02.2013 at 2.00 p.m.
3	Opening of technical bids	25.02.2013 at 3.30 p.m.
4	Opening of financial bids	Shall be informed to technically qualified bidders
5	Cost of BOQ/bidding document	Rs. 10,000=00 vide Demand Draft in favour of Bihar State Pollution Control Board, Payable at Patna.

3. All the bids must be accompanied by bid security in accordance with the bidding documents.

Member Secretary

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1.0 GENERAL TERMS AND CONDITIONS

1.1 (i) The Tender Document along with detailed specifications of the instruments/ equipments can be obtained in person from the office of the Member Secretary, Bihar State Pollution Control Board, Patna or by the authorized representative on submission of prescribed tender fee in the form of demand draft drawn in favour of Bihar State Pollution Control Board, Payable at Patna.

(ii) The bid document may also be downloaded from BSPCB website **Website.bspcb.bih.nic.in**. Bidders using downloaded tender forms from BSPCB website must submit cost of tender document by demand draft drawn in favour of Bihar State Pollution Control Board Payable at Patna along with technical bid. The bid form downloaded through BSPCB website submitted without tender fees will not be accepted.

(iii) The Bid must be submitted in English. In the case of foreign manufacturers, the bids should be submitted by the authorized agents / representatives, they must enclose authorization letter issued by their manufacturer. In case of the equipments / instruments of Indian origin the bids shall be accepted from manufacturer or its authorized representative/agent.

1.2 The tender document is not transferable by the purchaser. The bid form in the tender document at Annexure-II will be used for technical bid. Tender document downloaded from the BSPCB website **Website.bspcb.bih.nic.in** can also be used. Bids made on photocopy etc. will not be considered. However, the additional sheets containing the same Pro-forma may be used for each item. Each sheet must be signed by the bidder. The price bid must be in the form provided herewith at Annexure-III. It should be sealed in separate envelope.

1.3 The tender will not be accepted from the firm to whom the document has not been issued by the Board or bid form downloaded from the BSPCB website **Website.bspcb.bih.nic.in** without tender fee.

1.4 The Board reserves the right to accept or reject any or all the tenders in part or full without assigning any reason thereof.

1.5 The bidder is expected to examine all instructions, forms, terms and conditions and specifications mentioned in the bid document carefully. Failure to furnish all information required by the bid documents or submission of a bid not substantially responsive to the bid document in every respect will be at the bidder's risk and may result in the rejection of its bid.

1.6 The Board at its discretion may extend the last date of submission of tender and opening of tenders. The final authority for acceptance of a tender will rest with the Member Secretary, Bihar State Pollution Control Board who does not bind himself to accept the lowest tender and may accept or reject any or all of the bids received without assigning any reason.

1.7 Documents, literature, diagrams / leaflets, original catalogue of equipment and samples etc., enclosed with the bids shall become the property of the Board without any cost.

1.8 **WARRANTY: The comprehensive warranty period will be for thirty six months** starting from the date of successful commissioning of the instrument. Under this warranty, upon the receipt of such notice, supplier / agent shall, within the period specified, repair /replace the defective instrument or spare parts thereof at the ultimate destination. The supplier/agent shall take over the replaced parts/goods, in the event of any correction of defects or replacement of defective material. In such cases, the warranty for the corrected/replaced materials shall be extended to the left over period of warranty. The comprehensive warranty includes maintenance of equipments including spare parts etc.

1.9 The tender would be regarded as turned down, if no award of contract has been obtained till the expiry of the tender validity. No separate communication will be made in this regard.

1.10 The items have to be supplied in standard packing at the Central Laboratory, Bihar State Pollution Control Board, Beltron Bhawan, Shastri Nagar, Patna-23

1.11 In case of the date of submission and the date of opening of tender is declared as Public Holiday, the tender shall be submitted and opened on the next working day at the same time.

1.12 The bid shall contain no interlineations, erasures or overwriting words except as necessary to correct errors made by the bidder, in such case, correction shall be initialed by the person or persons signing the bid.

1.13 Late and delayed tenders will not be considered and shall be returned unopened to the Bidder.

1.14 It is advised that the outside suppliers should send the tender through Registered Post. However, the local supplier may drop their tenders in tender Box kept in, BSPCB, Patna for this purpose. In no case, tender should be handed over to any employee of the Board.

1.15 Canvassing in any form will disqualify the bid.

1.16 Request for the tender document for bidding through Telex, Telegram, Telephone, Money Order and Tele-fax shall not be entertained.

1.17 The tender Notice No. BSPCB/LAB/INSTUMENTS/2012-13/1/49, Dt. **31.01.2013** along with the item code number (The item code number is given in the specification sheet against each item) must invariably be quoted in the bid and for further correspondence in this regard.

1.18 **All the Tenders should be addressed to:**

Member Secretary
Bihar State Pollution Control Board
BELTRON Bhawan, Shastri Nagar, Patna-800 023
Bihar (India)

2.0 SUBMISSION OF BID

2.1 The bid prepared by the bidder and all correspondence and documents relating to the bid shall be written in English language. . The check list for submission of bid is available at **Annexure - IX**

2.2 The Bidders are requested to quote the rates item-wise for each equipment on FOR destination basis including total price of each instrument separately indicating the Govt. levies, and other expenditure item-wise. The freight charges and insurance will be borne by the buyer in the case of imported items. **For indigenous items supplied by Indian firms, the rate should be FOR central laboratory of BSPCB**, Excise Duty excluded price should be quoted as necessary exemption certificate as applicable will be supplied by the Board. Taxes and other levies, insurance freight etc. if any, should be indicated separately also. No C/D form will be issued by the Board for CST / VAT.

IMPORTANT:

Bidder is expected to examine the bidding documents carefully and are deemed to have received and read all relevant documents. It shall be the responsibility of the bidder to request for copy of any missing document. Failure to do so will be at bidders risk.

The Supplier should attach a copy of financial bid / Pro-forma Invoice of the Instrument quoted (without cost / price figures) along with the technical bid to assess the item / components quoted in the bid. The manufacturer will give the undertaking (Annexure IV) that he or his authorized dealer will service /repair the equipment during guaranty / warranty / maintenance contract.

2.4 It may be noted that mere quoting lowest rates will not entitle any firm to get the order. For qualifying technical bid the quality of the item being offered, the past performance, supply etc. will also be taken into consideration. The Board may call for any details, explanation, regarding technical & financial aspect.

2.5 **Bidder can quote the rates for all the instruments tendered or some of the instruments or one instrument. Separate price bid and technical bid should be submitted in separate envelopes for each item clearly mentioning the item code number, item name on the top of the envelopes with senders name and address. EMD should be submitted separately against each item.** Item -wise technical specification and price should be in separate sheets i.e. there should be separate envelope for each item containing technical, price bid & item wise EMD, incase, bidders desire to quote more than one item.

2.6 The tender is to be submitted "**Single Stage- Two Envelope System**" i.e. the first sealed envelope will contain full information required to judge pre-qualification signed tender document, tender fee, earnest money, complete details and specification of the instruments offered in **Annexure – II (without quoting price)** including the brochure/ leaflets and original catalogues, list of credentials with documentary evidence i.e., purchase/ work order etc., PAN-Number VAT/Sales Tax Registration No., Affidavit for not being black listed. It shall be marked as technical Bid **No. BSPCB / LAB/2012-13/149, Dt. 31.1.2013** due on **25.02.2013** for Laboratory Instruments /Equipments. The second envelope will contain only price quoted by the bidder in the form given at **Annexure –III** of this document and shall be clearly marked "**Price Bid No. BSPCB/LAB/2012-13/1/ Dt.31.1.2013** for Laboratory Instrument / Equipments. Both the above envelopes must be separately sealed and shall be kept in one envelope bearing the address of BIHAR STATE POLLUTION CONTROL BOARD and prescribed with bold letter **TENDER. FOR LABORATORY INSTRUMENT / EQUIPMENT NOT TO OPEN BEFORE 25.02.2013 AT 03.00** P.M. The senders address should be mentioned in all envelopes. Instrument / equipment Code Number should be mentioned invariably on
all envelopes

2.7 Technical part of the tender will be opened on due date i.e. at 3.00 P.M. on **25.02.2013** in the office of the Board, in presence of the representative of the tenderer, who would like to be present. Sealed Price part of technically and commercially acceptable tenders will be opened on a later day subsequently as decided by the board. The date of opening of financial bid will be communicated by the Board to the successful bidders whose techno-commercial bid is found substantially responsive.

2.8 EARNEST MONEY/ SECURITY DEPOSIT

(i) **The Earnest Money(2% of the estimated value**) as indicated in Bid document at **Annexure -V** must be submitted by the Bidder along with the Tender in the form of Demand Draft only drawn in favour of BIHAR STATE POLLUTION CONTROL BOARD payable at Patna. It should be in Indian Rupees. The Indian agent / representative should furnish an authorization letter from their foreign Principal supplier authorizing to deposit the EMD on their behalf.

(ii) The Earnest Money shall be forfeited if a bidder withdraws or amends the tender in any respect within the period of validity of his tender or fails to

submit security deposit or agreement within the specified period as mentioned in the tender document. Tender shall not be entertained where a bidder has not furnished adequate earnest money in the prescribed and acceptable form. In case, the instrument supplied is found defective and not attended by the supplier /authorized agent, the Security Money deposited by the supplier /their authorized Indian agent will also be forfeited.

2.9 Earnest money/ security deposit will not be taken from the following:

Undertakings, Corporations, Autonomous bodies, Registered Societies Co-operative Societies which are controlled/ managed by Government, Govt. Undertakings and Companies of Union Government and Government of Bihar.

2.10 **Return of earnest money:** Unsuccessful bidder's earnest money will be discharged/ returned without any interest after the concerned purchase is finalized and that of successful bidders will be adjusted (without interest) in security deposit.

2.11 **The validity of tender would be for a minimum period of 180 days from the date of opening of tenders**. A Bid valid for a shorter period may be rejected by the Board as non- responsive. In case the validity is to be extended; the Board may solicit the Bidder's consent to an extension on the period of validity and the bid shall remain valid for the extended, period mutually agreed for.

2.12 The prices should be quoted both in words and figures.

2.13 Arithmetical error will be rectified on the following basis:- If there is discrepancy between the unit price and total price that is obtained by the multiplying the Unit Price and quantity, the unit price shall prevail and the total price shall be corrected. If there is discrepancy between words and figures, the amount in words will prevail.

2.14 Tenders not in proper sealed cover or received through telegraphically or E-mail fax/telex will not be entertained.

2.15 Conditional Tenders will be rejected without assigning any reason.

2.16 The Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person duly authorized for this purpose. The letter of authorization should bear the signatures of only the authorized person of the firm. All pages of the Bid, except for un-amended printed literature shall be initialed by the person or persons signing the bid.

2.17 **Clarification of Techno- commercial bids**

To assist the techno -commercial examination , evaluation and comparison of bids the Board may, at its discretion, ask the bidder for a clarification of its Techno-commercial bid. However, all responses to request for clarification shall be writing, and, no change in the price bids be sought, offered or permitted.

2.18 Eventual suggestions for modification or subsidiary Tenders are principally not admissible.

2.19 **The specifications are clearly mentioned in the document and the Bidder is requested to submit Bid only if their offer strictly comply to these specifications. The bidding for the instruments having different specification will be on Bidder's risk as the Board will not entertain such bids. Bids carrying the statement like "specification as per tender document" shall not be entertained. the product specifications supported by technical literature and list of users must be enclosed with Annexure II.**

2.20 The placement of work order/purchase order will be according to technical evaluation of the tender and after consideration of its price worthiness.

2.21 The price to be given in the tender are fixed prices, irrespective of rise in Materials prices etc., till the delivery of the overall consignment. No request regarding increase in the price of instruments etc., will be entertained after the submission of the tender.

2.22 The nomenclature of the instruments and spares will be invariably same in Pro-forma Invoice, Invoice, Packing list and all other relevant papers in case the Bidder is awarded with the purchase order for supply against its offer.

2.23 With the submission of his tender the bidder accepts the conditions of the tender.

2.24 If the instrument supplied is not in conformity with the specification other than asked for, it will have to be replaced at the risk and cost of the supplier. No freight and other charges for export and re-shipment will be paid by the Board.

2.25 **The authorized Indian agent/representative should have minimum two years continuous agency/ partnership/ joint venture/ participation or collaboration with their principal foreign supplier**. The documentary proof of such agency ship/ authorization/ MOU should be submitted along with the technical part. If the bid of the firm does not contain the proof of such nomination/authorization, Indian agent will be rejected.

2.26 **The installation of the instruments is the entire responsibility of the supplier. It must be done either by the principal supplier or their authorized agents within 150 days from the date of opening of LC in case of foreign suppliers. For Indian supplier the installation should be completed within 100 days from the date of issue of purchase order.** The supplier or their authorized agent should be in touch with the Central Laboratory of the Board to know the exact day of receipt of stores supplied/ dispatched by them.

2.27 The list of instruments/equipments, their approximate quantity and point of delivery is given at Annexure-V and the detailed specification of the instrument are given in the tender document. The quantity mentioned in the tender document may be increased or decreased at the discretion of the Competent Authority in the Board without assigning any reason.

2.28 Each and every folio of the tender must be signed by the bidder.

2.29 The Bid shall be considered only for those instruments for which the rates have been specifically quoted. The Board further reserves the right to accept the tender for all the instruments or some of the instruments for which the tenderer has quoted the bid. The bidder should attach a separate list for the consumable/spares required for smooth operation of the instrument at least for three years (as optional items) and two copies of trouble shooting manuals, electric circuits etc. along with the bid. Combined EMD and consolidated bids will be rejected. **EMD and tender should be submitted separately for each equipment.**

2.30. Bidder has to provide training on operation and maintenance to Board Officials of laboratory without any additional charges. However, training for sophisticated instrument will be provided by the bidder as specified in respective technical specifications of the instrument.

2.31 The instrument for which tenders are invited will have to be supplied within **90** days from the date of opening of LC if the goods are imported.(in the case of foreign suppliers the date of arrival of consignment at Indian port will be considered as the date of delivery). **A period of 60 days will be allowed for delivery of equipment from the date issue of purchase order in the case of Indian manufacturers/suppliers. In case of delay in delivery the liquidated damages will be levied as per Para no 13 from successful bidder.**

2.32 After sales service is most important to be considered for comparison of the bids. Bid of those firms who do not have Indian / Local Agents to provide after sales and service during warranty period will not be considered. After sales service must be provided at the premises of the Laboratory / Offices of BSPCB, by the manufacturer or authorized service provider. The instrument will not be sent to the service provider for the repair.

2.33 In case of imported instruments, the bid from Principals or their authorized agents will only be considered. The instrument price should be quoted on FOR BSPCB basis, the delivery shall be taken at Central laboratory, BSPCB, Patna.

2.34 The foreign bidders must indicate the following information in their Pro-forma invoice along with the Price Bid separately for each instrument/equipment.

a) Country of Origin.
b) Port of Shipment.
c) Name & Address of beneficiaries Bank, Branch name with Account No.
d) Whether trans-shipment/partial shipment is required or not.
e) The Indian Agent's complete address, telephone & fax number.

2.35 **(a)** The items have to be supplied in standard packing. The foreign supplier should use the minimum possible packets and should reduce the size of the packing in volume to avoid extra demurrage in the bonded warehouse in India, if any.

(b) Important Bank charges: - All Bank charges within the country (in India) will be buyers account and all Bank charges outside the country should be borne by the supplier / beneficiary. The bidders may note this and quote the price of the instrument/ equipment accordingly. In the case of Foreign Suppliers, they will have

to ensure shipment of the consignment as per the validity of the letter of credit established in this regard. In case of extension of supply date is sought, the bank charges towards the amendment of L.C. should be borne by the Beneficiary/Supplier.

2.36 Foreign Principals/their authorized Indian Agent shall intimate the buyer regarding the date of shipment well in advance. A copy of the invoice documents, air way bill, packing list, certificate of country of origin may be forwarded to the purchaser by fax immediately after shipment of the consignment to clear from custom authorities so as to avoid demurrage charges. The consignment is to be get cleared by supplier from custom and he will deliver the item at Central and Regional laboratories.

2.37 At any time prior to the deadline for submission of bids ,the buyer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by an amendment.

2.38 The Amendment made by the competent authority in the tender document if any will be binding on the bidders.

2.39 In order to offer prospective bidder reasonable time in which to take the Amendment into account in preparing their bids, the purchaser may at its discretion, extend the deadline for the submission of bids.

2.40 According to the bidder, if the tender documents contain unclear points which could influence price calculations, the bidder has to inform the authority who is issuing the call of Tenders before submission of its Tender, either in writing or by fax, even if he has pointed out this earlier in any other form/reference.

2.41 The Packing, Forwarding, charges must be quoted according to the place of delivery at Central Laboratory, BSPCB, Patna. The supplier will be held liable for any damage, theft or loss during transit. The instruments are to be dispatched to the respective places directly and to be installed there, by the supplier under intimation to, BSPCB Office at Beltron Bhawan Shastri Nagar Patna-23. **Please note that Performa Invoice must be separate for each instrument / equipment.**

2.42 For the comparison of the rates quoted in different currencies by the bidders, the comparison will be done on the basis of conversion of currency in **Indian Rupees on the date of opening of technical bid of the tender.**

3.0 PAYMENT CONDITIONS

3.1 (i) **For Foreign Bidders**: - The foreign bidders should quote the price in foreign currency. In case, they have components and services of Indian agent, the same may be quoted in Indian Rupees.

100% payment will be released through irrevocable Letter of Credit in the name of foreign bidders for stores of foreign origin.

80% payment will be made on shipment of the instrument/Equipments and on furnishing **Bank Guarantee**/**Bank Draft for 10 % of the purchase order as**

performance security, .For release of payment the supplier shall submit documents as specified in A**nnexure VI A**

20% will be released on satisfactory installation, training and commissioning of instrument / equipment.

(ii)**For Indian bidders** 100% payment will be released on satisfactory supply installation, training and commissioning of the instrument and on furnishing **Bank Guarantee/Bank Draft for 10 % of the purchase order value as performance Security.** The supplier shall provide the documents with each instrument as mentioned at **Annexure- VI B.**

3.2 **The Performance Security** shall be furnished by the principal supplier or their authorized Indian agent from any Nationalized Bank as **Bank Guarantee. Performance security shall be valid up-to expiry of the warranty period.**

3.3 The defective, substandard and contrary to the specification of instruments, if supplied have to be replaced by the supplier at their cost and responsibility. In case of indigenous instrument/ equipment quoted by Indian firms/ representatives/ Indian agents of foreign supplier / manufacturers in rupee terms the payment will be made in Indian rupees directly after supply and satisfactory installation / commissioning.

3.4 Single bills against one order as per supply order mentioning item code and other details will be accepted.

3.5 The reference of supply order should be submitted for payment.

4.0 SETTLEMENT OF DISPUTE, ARBITRATION

4.1 All disputes or difference arising out of or in connection with the contract and supply of any item/equipment assigned under the same (whether during the progress of the works or after their completion, determination, abandonment or breach of the contract) shall be settled by the Chairman, Bihar State Pollution Control Board in accordance with the Arbitration and Conciliation Act, 1996. The arbitrators appointed by the Chairman, Bihar State Pollution Control Board. The Chairman, Bihar State Pollution Control Board, Patna shall appoint a sole arbitrator. The decision of the sole arbitrator shall be final and binding on both the parties. It will not be an objection to any such appointment that the arbitrator is the Government servant and had any interest in the Board or the contract entered in to directly or indirectly. In all cases, the arbitrator shall state his decision in writing. Arbitration proceedings shall be held at Patna, Bihar (India) and the language of arbitration proceeding and that all documents and communications between the parties shall be in English.

4.2 It is a term of the contract that the party invoking the dispute shall specify the dispute or disputes to be referred to the arbitrator under this clause together with the amount or amount claimed in respect of each such dispute.

4.3 It is also a term of the contract that if the supplier (s) do not make any demand in respect of any claim (s) or dispute in writing within 90 days of submission of the final bill for payment, the claim of the supplier will be deemed to have been waived and absolutely barred and the Board will be discharged and released of all liabilities under the contract in respect of these claims.

4.4 LAWS AND REGULATIONS

The formation, validity and performance of this Contract shall be governed as to all matters by and under the laws and regulations of India and courts of Patna shall have exclusive jurisdiction in all matters arising under this Contract.

The Supplier shall respect and abide by all laws and regulations of India and shall make its best effort to ensure that the personnel of the Supplier and their dependents, while staying in India, shall respect and abide by all laws and regulation of India.

The Supplier shall protect, absolve and indemnify the Board, and their representatives from any claim, loss or damage arising from any non compliance alleged or proved, without claiming them for payment.

4.5 FORCE MAJEURE

Vendor shall not be considered in default if delay in delivery occurs due to causes beyond his control such as acts of God, natural calamities, civil, wars, strikes, fire frost, floods, riots and acts of usurped power. Only those causes which have a duration of more than seven calendar days shall be considered cause of force majeure. A notification to this effect duly certified by the Local Chamber of Commerce/Statutory Authorities shall be given by the Vendor to the buyer by registered letter. In the event of delay due to such cases a length of time equal to the period of force majeure or at the option of the buyer may be extended, the order may be cancelled. Such cancellation would be without any liability whatsoever on the part of buyer. In the event of such cancellation the vendor shall refund any amount advanced by the Purchaser and deliver back any material issued to him by the Purchaser and release facilities, if any, provided by the Purchaser.

5.0 INJURY AND DAMAGE

5.1 Injury or Death of Persons

The Supplier shall be liable for and shall indemnify the Board against any liability, loss, claim or proceedings, whatsoever arising under any statue or law in respect of personal injury or death or any disability caused by the carrying out the Works.

5.2 Damage to Property

The Supplier shall be liable for and shall indemnify the Board against and insure and cause any Manufacturers and subcontractors to insure against any expense, liability, loss claim or proceedings in respect of any damage whatsoever to any real or personal property for any one occurrence in so far as such damage arises out of or in the course of or by reason of the carrying out of the Works and is due to any negligence, omission or default of the Supplier or any person for whom the supplier is responsible or any Manufacturers and subcontractors or person whom the Manufacturers and subcontractors are responsible.

6.0 ROYALTY AND PATENTS

6.1 The Supplier shall pay all royalties and licenses fees for the use of any patented item, whether it may be an invention, method, arrangement, article, process or appliance used in connection with the performance of the Contract. The supplier shall indemnify and save harmless the Board against any and all costs, damages and expenses of any nature or kind whatsoever which may arise out of or result from a claim by any person, firm or corporation that the manufacture, purchase, use of sale of any of the inventions, methods, arrangements, articles processes or appliances used in connection with the performance of this Contract infringes any patent of such other rights. The Supplier shall, at the request of the Board, defend the Board against any suit brought to enforce any such claim at the Suppliers expense.

6.2 In case any such patented item used on or in conjunction with the Works is in suit held to constitute and infringement of its use enjoined, the supplier shall either secure for the Board the right to continue using the said item by suspension of the enjoinment, by procuring for the Board a license or otherwise, or will replace such items with a non-infringing item or modify it so that it becomes non- infringing or with the Boards approval remove the said enjoined item and refund to the Board the sums paid thereof.

7.0 EFFECTIVENESS

This Contract shall come into force and effect on the date of the Letter of Award and shall be in force until the expiry of the warranty period and all the payments have been made to the Supplier.

8.0 Forfeiture of earnest money:- The earnest money will be forfeited in the following cases:

(i) When bidder withdraws or modifies the offer after opening of tender but before acceptance of tender.

(ii) When bidder does not execute the agreement if any, prescribed within the specified time.

(iii) When the bidder does not deposit the security money .

9.0 Performance Security Deposit:-

1. Successful bidder will have to deposit performance security equal to 10% of the value of the contact price.

2. Within thirty (30) days of notification of award from the Board, the successful Bidder shall furnish the Performance Security in the form of bank guarantee issued by a reputable bank having license to do business in India or as bank draft payable to Bihar State Pollution Control Board, Patna for an amount equivalent to 5 % of the Contract Price, for the guaranty/warranty period.

3. Remaining 5 % shall be deducted from the bill after adjustment of earnest money (2 % of estimated value) submitted during bid submission.

4. No interest will be paid by the State Board on the performance security money.

5. The performance security money shall be refunded after the expiry of the period of guarantee / warranty and after satisfied there are no dues outstanding against the bidder

6. In case of non submission of performance security of 10%, the same will be deducted from the bill after adjustment of earnest money. The decision in this regards shall be obtained from Board on request of the bidder.

10.0 Forfeiture of Performance Security Deposit-

Performance Security amount in full or part may be forfeited in the following cases:-

(a) When any terms and conditions of the contract is breached.
(b) When the bidder fails to make complete supply satisfactorily
(c) Notice of reasonable time will be given in case of forfeiture of security deposit.

The decision of the Member Secretary in this regard shall be final.

11.0 The expenses of completing and stamping the agreement shall be paid by the bidder and the State Board shall be furnished free of charge with one executed stamped counter part of the agreement.

12.0 **Insurance:-** The goods will be delivered at the destination in perfect condition. The supplier, if he so desires, may insure the valuable goods against loss by theft, destruction or damage, by fire, flood, under exposure to whether or otherwise viz., (war rebellion, riot, etc.,). The insurance charges will be borne by the supplier and State Board will not reimburse such charges

13.0 **Liquidated damages:-**

(1) The time specified for delivery in the tender form shall be deemed to be the part of the contract and the successful bidder shall arrange supplies within the period from the date of supply order issued by the **Member Secretary, Bihar State Pollution Control Board, Patna (Bihar) .**

(2) In case of extension in the delivery period with liquidated damages the recovery shall be made on the basis of following percentages of value of Stores which the bidder has failed to supply:-

(a) Delay up to one month of the prescribed delivery period 2.5%
(b) Delay exceeding two month of the prescribed period. 5%

(3) The maximum amount of liquidated damages shall be 5%

(4) If the supplier requires an extension of time in completion of contractual supply on account of occurrence of any hindrance he shall apply in writing to the authority, which has placed the supply order, for the same immediately on occurrence of the hindrance but not after the stipulated date of completion of supply of goods.

(5) Delivery period may be extended with or without liquidated damages if the delay in the supply of goods is on account of hindrances beyond the control of the bidder.

14.0 **Recoveries:-** Recoveries of liquidated damages, short supply, breakage, rejected articles shall ordinary **be made from bills.** Amount may also be with held to the extent of short supply,· breakage, rejected articles and in case of failure

in satisfactory replacement by the supplier along with amount of liquidated damages shall be recovered from his dues and, security deposit available with the department. In case recovery is not possible appropriate action will be taken under Bihar PDR Act or any other relevant law in force.

15.0 Inspection:-

(a) The Member Secretary BSPCB Patna, or his duly authorized representative shall have right for inspection of the instrument/equipments at premises of the bidder. In case of foreign supply, the bidder is required to submit the certificate of testing, materials and workmanship of the instrument /equipments machineries during manufacturing process or afterwards as may be decided.

(b) The bidder shall furnish complete address of the premises of his office, godown and workshop with contact number of responsible person where inspection can be made together with name and address of the person who is to be contacted for the purpose. In case of those dealers who have newly entered in business a letter of introduction from their bankers will be necessary.

16.0 Clearance of consignment from Customs:-

For imported items, Clearance of the consignment from Customs will be done by the bidder. Any custom duties paid as applicable under registration of Dept. of Science and Technology for clearance of the consignment shall initially be paid by the bidder and the same shall be reimbursed by BSPCB after production of documentary evidence at actual as per Govt. Rules. **THE BOARD WILL REIMBURSE THE CUSTOM DUTY ONLY, NO OTHER CHARGES WILL BE BORN BY THE BOARD.** The delivery of goods will be taken at Central laboratories.

17.0 Demurrage charges: -

In case, any demurrage charges are paid to release the consignment from custom, it will be borne by bidder.

18.0 Rejection:-

i. Articles not approved during inspection or testing shall be rejected and will have to be replaced by the bidder at his own cost within the time fixed by the Member Secretary.

ii. If, however due to exigencies of Bihar State Pollution Control Board work, such replacement either in whole or in part, is not considered feasible, the Member Secretary after giving an opportunity to the bidder of being heard, shall for reasons to be recorded, deduct a suitable amount from the approved rates. The· deduction so made shall be final.

iii. The rejected articles shall be removed by the bidder within 15 days of intimation of rejection, after which Board shall not be responsible for any loss, shortage or damage and shall have the right to dispose of such articles as he thinks fit, at the bidder's risk and on his account.

19.0 The bidder shall be responsible for the proper packing so as to avoid damage under normal conditions of transport by sea, rail and road or air and delivery of the material in good condition to the consignee at destination. In the event of any loss, damage, breakage or leakage or any shortage the bidder shall be liable to make

good condition such loss and shortage found at the checking/inspection of the materials by the consignee. “No extra cost" on such account shall be admissible.

20.0 The Member Secretary can repudiate the contract for the supply, at any time, if the supplies are not made to his satisfaction after giving an opportunity to the bidder of being heard and recording of the reasons for repudiation.

MEMBER SECRETARY

Annexure-I

BIHAR STATE POLLUTION CONTROL BOARD

BELTRON Bhawan, Shastri Nagar, Patna-800 023
EPABX - 0612-2281250/2282265, Fax - 0612-2281050
Website: Website.bspcb.bih.nic.in

BSPCB/LAB/INSTRUMENTS/2012-13/1/49 **Dated-31.01.2013**

APPLICATION FORM (To be filled by the bidder)

1. Name and full address of the: _____
   Bidder including Telegraphic _____
   Address/Telex No. and Fax No. _____

2. Name and designation of the _____
   Head of the Firm/supplier and _____
   his Telephone No. _____

3. i)In case the supplier is located out of Bihar; specify the authorized Distributor's or Agent's Address in Patna, if any.

   ii) Name, Designation, Address _____
   Telephone & Fax Numbers of the _____
   Authorized Person who may be
   Contacted during the process of the _____
   Purchase concerned under this document
   (Applicable for all the suppliers)

4 Instrument item Code Number(s) quoted for :

5 Whether Earnest Money Deposited: Yes / No If yes (Amount: in Rs.) _____,

/Demand Draft No, Date,_____and Name of Issuing Bank _____

6. Tender document fees Rs 10,000/- details DD / Cash receipt No_____, Date _____and

   Name of Issuing Bank _____

7 Income Tax Clearance Certificate:
Attached (Latest) with PAN Number Yes or No
.
All the terms and conditions of the tender documents have been read carefully and are accepted.

Place:
Date : Legally Binding Signature with stamp

ANNEXURE - II

BIHAR STATE POLLUTION CONTROL BOARD

BELTRON Bhawan, Shastri Nagar, Patna-800 023
EPABX - 0612-2281250/2282265, Fax - 0612-2281050
Website: Website.bspcb.bih.nic.in

Bid Form For (Name Of The Instrument)_____

BID FORM FOR TECHENICAL BID Please do not write the Price

Details showing quantity, specification and other details of the instruments offered (Instrument / Equipment code No._____)
(to be filled by the bidder and must be kept marked as Technical Bid" part of the Tender)

S. No.	Name of Item	The Specification offered by the Bidder	Difference in Specifications of tender document and that of Bid, if any	Quantity	Unit Price (excluding rates at col. no. 7) indicate the name	Taxes and other expenditures (Sales Tax /VAT, C.S.T, freight, cost of installation & training (in case	Total Amount (FOR BSPCB in Rupees)
1	2	3	4	5	6	7	8
					PLEASE DO NOT WRITE RATES / PRICE HERE		

NOTE:- If this sheet is not sufficient to accommodate the bid, the additional sheets may be used containing the same Proforma but all such sheets including this one must be signed on each sheet by the Bidder along with the seal. Separate Bid form should be attached for each equipment, quoted for.

Signature with date & stamp of the bidder

ANNEXURE -III

BIHAR STATE POLLUTION CONTROL BOARD

BELTRON Bhawan, Shastri Nagar, Patna-800 023
EPABX - 0612-2281250/2282265, Fax - 0612-2281050
Website: Website.bspcb.bih.nic.in

Bid Form For Price Bid For (Name Of The Instrument)_____
Details showing quantity, specification and other details of the instruments offered (Instrument / Equipment code No._____)
(To be filled by the bidder and must be kept in "Price Bid" part of the Tender)

S. No.	Name of Item	The Specification offered by the Bidder	Difference in Specifications of tender document and that of Bid, if any	Quantity	Unit Price (excluding rates at col. no. 7) indicate the name of the currency (in figure & words)	Taxes and other expenditures (Sales Tax/VAT, C.S.T, freight, etc.	Total Amount (FOR BSPCB) including all charges (in figure & words)
1	2	3	4	5	6	7	8

NOTE:- If this sheet is not sufficient to accommodate the bid the additional sheets may be used containing the same Proforma but all such sheets including this one must be signed by the Bidder along with the seal. This Annexure must be enclosed in the Proforma Invoice price bid for item wise. Separate Bid form should be attached for each equipment / instrument, quoted for.

Signature with date & stamp of the bidder

ANNEXURE - IV

UNDERTAKING

To be given by Principal Manufacturer

TENDER NOTICE No. BSPCB/LAB/INSTRUMENTS/2012-13/1/49 Dt. 31.1.2013

TO
THE MEMBER SECRETARY
BIHAR STATE POLLUTION CONTROL BOARD
BELTRON BHAWAN, SHASTRI NAGAR, PATNA-800 023 .

Sir,
We have examined the conditions of tender document and specifications of the instruments/ equipments, the receipt of which is hereby acknowledged. We, the undersigned, offer to supply, deliver and install the (Name of equipment / instrument):

(Please add additional pages, if required)The above supply, installation shall be in conformity with the specifications and conditions of tender.

We undertake, if our bid is accepted to deliver the instruments quoted by us, we shall deliver and install within the period indicated in the tender document.

We agree to abide by this bid for a period of 180 days from the date fixed for Bid opening and it shall remain binding upon us and may be accepted at any time before expiration of that period.

We are submitting a demand draft (Payable At Patna) for Rs..... in favour of " Bihar State Pollution Control Board", Patna towards the Earnest Money.

This bid, together with your written acceptance thereof in your notification of award shall constitute a bidding contract between us.

We understood that you are not bound to accept the lowest or any bid you may receive.

We or our authorized dealer shall provide the spares/service of equipment under warranty / guarantee and also during AMC after expiry of warranty / guarantee. If authorized dealer is not available or authorized dealer is changed, we (manufacturer) will be responsible for service / repair of the equipment supplied by us.

Dated this.....day of.....2012

Signature of authorized Person,
Name with Stamp & full Address.

ANNEXURE-V

Schedule of Earnest Money

List of instrument / equipments with code no. And delivery destination

S. No.	Description of Instrument	Instrument / Equipment code No.	Approx. Qty. Nos.	Estimated Cost (Rs. In Lac)	Earnest Money Amount (in Rs.) 2% of the estimated cost
1	pH meter (Digital) Bench top	01	4	1.0	2000
2	Turbidity Meter (Bench Top Model)	02	6	1.50	3000
3	Conductivity Meter (Bench Top Model)	03	6	1.80	3600
4	Analytical Balance	04	2	6.0	12000
5	Ion Analyser	05	4	8.0	16000
6	Water Bath (Thermostatic)	06	4	0.2	400
7	UV-Visible Spectrophotometer (PC Controlled)	07	2	4.0	8000
8	COD Refluxer with Air Condensers	08	4	1.0	2000
9	Autoclave	09	6	1.80	3600
10	Bacteriological Incubator	10	2	0.50	1000
11	Hot Air Oven	11	4	1.0	2000
12	Hot Plate	12	3	0.60	1200
13	Magnetic Stirrer with Hot Plate	13	4	0.20	400
14	Flame photometer (Digital)	14	3	1.20	2400
15	Digital Colony Counter (Electronic)	15	4	0.20	400
16	Heating Mantle 1 KW (3) and 0.50 KW(3)	16	6	0.12	240
17	U.P.S. 7 KVA	17	1	2.0	4000
18	Combustion Gas Analyser (Flue gas Analyser)	18	1	3.0	6000
19	BOD Incubator	19	3	3.0	6000
20	Microwave Digester	20	1	8.0	16000
21	Muffle Furnace	21	4	1.60	3200
22	Ambient CO Analyser with DAS	22	1	6.0	12000

23	Ambient SO_2 Analyser with DAS	23	1	6.0	12000
24	Ambient NO_X (NO-NO_2-NO_X) Analyzer with DAS	24	1	6.0	12000
25	Ambient Ozone (O_3) Analyser with DAS	25	1	6.0	12000
26	Automatic Multi calibration system for Ambient gas Analyzer with Span gas and other accessories	26	1	6.0	12000
27	Atomic Absorption Spectrophotometer	27	1	40.0	80000
28	Mercury Analyser	28	1	0.50	1000
29	CO/HC Analyser	29	1	1.50	3000
30	Smoke Density Meter	30	1	2.0	4000
31	Micro processor Controlled Specific Colorimeter	31	1	3.0	6000

Annexure – VI A

LIST OF DOCUMENTS FOR RELEASE OF PAYMENT THROUGH L/C.

Equipment of Foreign Origin:

1) Four (4) copies of the Manufacturer / supplier's invoice showing the Equipment's description, quantity, unit price and total amount

2) Original and Four (4) copies of the negotiable clean, on-board bill of landing marked freight prepaid and four copies of non-negotiable bill of landing;

3) Four copies of the packing list identifying contents of each package

4) Insurance certificate

5) Manufacturer and Suppliers warranty certificate

6) Factory test and inspection certificate

7) Certificate of country-of origin

Annexure – VI B

Equipment to be Supplied by Indian Manufacturer:

Upon delivery of the Equipment to the transporters, the Supplier shall notify the Board and mail the following documents to the Board.

1) Four copies of the Supplier's invoice showing the Equipment's description, quantity, unit price and total amount
2) Supplier's and/or Manufacturer's warranty certificate
3) Factory test & inspection certificate by manufacturer.
4) Insurance certificate

Annexure - VII

For Instruments and Equipments only.

Guidelines for Service Contract
(Annual Maintenance Contract / Comprehensive Maintenance Contract)

1. **The proposals for maintenance of equipment should be submitted for 5 years (Charges per year) after guarantee period of minimum 36 months with spare & parts. The amount for the maintenance contract be mentioned for each equipment per year with tender document**
2. Two preventive maintenance & at least two break down visits per annum as & when required will be provided under service contract.
3. The firm shall depute service engineer to attend break down calls within 72 hrs from the receipt of the call from client. In the event of failure on the part of the firm in attending to the preventive maintenance visit or in attending breakdown calls within 72 hrs., The Member Secretary Bihar State Pollution Control Board, Patna or an authorized officer of State Board on behalf of the State Board will have the right to make the recovery by way of compensation @ 2% of the AMC Contract value per day. However firm shall not be responsible for delay in services due to non-availability of spares or due to any reason beyond its control & the duration of service contract will be increased /extended by such period.
4. The payment will be made on half yearly basis after satisfactory service within 60 days from the date of receipt of the bill. Notwithstanding anything here-in-above provided it will be the responsibility of firm to see that the system including equipment as a whole (including accessories, software) is kept in well working condition during the full period of contract besides the time reasonably & naturally required in rectification / servicing etc. The points of disputes being mutually decided circumstantially on which the decision of the undersigned shall be final & binding on firm subject to arbitration.

Signature of bidder
With Date, Seal & Address

Member Secretary
Bihar State Pollution Control Board

Annexure - VIII

CHECK LIST FOR THE BIDDER

1. Bid on original Tender form only.

2. Separate EMD against each instrument / equipments.

3. Earnest money or necessary documentary proof for exemption of earnest money with the part 1 of the bid. The technical specification should be in Annexure II without quoting rate in the column no. six to eight.

4. Price bid must be Part II of the bid in the form provided at Annexure-III of the tender document. It should be in a separate envelope.

5. The Basic Price, Taxes, Packing. Forwarding, Handling, Transportation Insurance, Installation charges, Training etc. must be quoted clearly. Do not use vague terms like "As Actual, Approximately etc".

6. Do not use the terms As per Specification of Tender Documents' in respect of instruments. There should be proper write up of product quoted for supported with printed leaflets literature.

7. In case the bidder desires to quote more than one item, separate envelope should be submitted (technical bid in Annexure II & price bid in Annexure III) for individual item super scribing item code number and name.

8. With technical bid, the bidder should provide a copy of the price bid format (giving details of the items, accessories, spares etc.) without specifying the price other than one mentioned in Annexure-III of this tender document.

9. The delivery of equipments/ accessories/ spares will be taken at Central lab at Patna.

10. The manufacturer will give an undertaking that during warranty and after expiry of comprehensive warranty period, if required, be responsible for annual Maintenance of the supplied item/equipment for providing AMC. Annexure- IV & VIII

11. The supplier has to provide Bank Draft as performance security deposit after receiving the supply order.

12. The documents required for release of payment are mentioned at Annexure- VIA & VI B

13. The Guidelines for AMC is available at Annexure- VII and format for submitting AMC charges is at Annexure- X

Annexure –IX

Form for submitting the AMC charges

Name of Equipment / Instrument

(……..……..)

Equipment / Instrument code No……

The AMC charges per year

S.No.	Year	AMC Charegs per year in Rs
1.	I	
2.	II	
3.	III	
4.	IV	
5.	V	

Signatures of Authorized Signatory
Place: Designation
Date: Seal

PART-B

Specifications
Of
Instruments / Equipments

ITEM CODE: 01

pH METER (DIGITAL) BENCH TOP

Microprocessor based bench top pH meter for routine measurement of pH / mV & temperature with batteries or mains operation and large multifunction digital display, automatic temperature compensation, and parallel temperature display, 5- point calibration system in a set including gel filled pH combined electrode with inbuilt temperature sensor. The equipment should be water proof, light weight and portable.

Technical Specifications:

Display Range	0.0 0 to14.00 pH
Resolution / Accuracy	±0.005 pH
Calibration	5 point calibration:
mV Range	-999.9 . +999.9 mV; -1,999 ... +1,999 mV
Resolution / Accuracy	0.1 mV / ±0.3 mV (± 999.9 mV); 1 mV/ ±1 mV (beyond ± 999.9 mV)
Temperature Range	- 5°C to 105°C
Resolution / Accuracy	0.1°C/± 0.1°C
Temp. Compensation	Automatic
Reference Temperature	Selectable between 20 & 25°C
Data Output	Via display and USB Port
Power Supply	Mains 230 ± 10 volts, 50 Hz, AC power and 4 x 1.5 Volt Rechargeable AA batteries
Protection Type	IP67, IP 67
Warranty	3 years on instrument & 1 year on electrodes.
Internal Diagnostics / Self Test Facility	Yes
Splash Proof Housing	Yes
Display	LCD, also display condition of Electrode
Simultaneous Temperature & pH Display	Yes
Membrane Keyboard with pressure defined points	Yes
Memory Data Sets	800
GLP Supports Functions	Yes
Calibration Protocol	Yes
USB Port	Yes (To attach normal printer & PC)
Limit Value Settings	Yes
Printer Option	Yes (Thermal Printer not accepted)
Sensor Validation	Yes

Combined Electrode Specifications

Measuring Range	0…..14pH
Operating range (Deg C)	0…80
Reference Electrolyte	Gel with one year replacement warranty
Membrane Shape	Cylindrical
Membrane resistance at 25 Deg C	< 1Gohm
Diaphgram	Ceramics /Glass
Shaft Material	Noryl / Epoxy
Temperature Sensor	built in NTC

Accessories :

(i) Power cord, Operational & Service Manual (Two Copies of each), Freely adjustable Electrode Stand Beakers for Calibration

(ii) NIST Traceable pH Buffer solution 1.68, 4.01, 7.41, 9.18 (5 X 100 ml of each with Certificate

(iii) The pH meter should be calibrated from NABL accredited calibration laboratory and calibration certificate will be provided.

ITEM CODE: 02

TURBIDITY METER (BENCH TOP MODEL)

Laboratory bench top turbidity meter suitable for measurements even for colored samples with Auto shut off with following specifications.

Display	Digital
Measuring Ranges	0 -10 NTU; 10-100 NTU; 100 – 100 NTU 1000 - 4000 NTU
Accuracy	± 2% of full scale in 100 to 1000 NTU + 1% of full scale in 10 to 100 NTU
Reproducibility	± 0.1 % of Value
Resolution	0.0001 NTU, up to 9.99 NTU
Range	0.001 NTU from 10.000 to 99.999 10 to 99.90 NTU 0.01 NTU from 100 NTU to 999.99 NTU 0.1 NTU from 1000 to 4000 NTU
Stray light	Less than 0.01 NTU
Light Source	Light emitting Diode for colorless samples and IR LED (Should cover both visible and IR range)
Power requirement	230 ± 10Volts / 50 Hz AC
Data Logging	Downloadable to PC or Printer
Calibration	4 Point calibration with vials for four standards and three samples.

Accessories :

(i) Should be provided with operation & maintenance Manual (Two Sets), Cable and plug, and dust cover,

(ii) Cuvettes and Cuvette stand and spares (One lamp, one Cuvette stand and ten Cuvettes).

(iii) The NIST certified Standards (with certificates) should be supplied with 500 ml of each standard according to 4 point Calibration.

(iv) Calibration certificate will be provided by manufacturer from NABL accredited laboratory

ITEM CODE NO.3

CONDUCTIVITY METER (BENCH TOP MODEL)

Microprocessor based, light weight bench top digital conductivity meter for measurement of conductivity, TDS, salinity and Temperature. Tough construction and waterproof conductivity meter with large multifunctional display, parallel temperature display and automatic temperature compensation. The data logging capability and the real time clock allows for all GLP functions. Data output optional built in printer via RS 232 digital interface for connecting with PC. Should have ability to set different cell constants so that the other special conductivity cells can be connected

Technical Specifications

Conductivity	0.0 µS/cm ... 500 mS/cm in 5 measuring ranges or AutoRange additionally for K = 0.1 cm-1: 0.00 µS/cm ... 19.99 µS/cm K = 0.01 cm-1: 0.000 µS/cm . 1.999 µS/cm
Specific resistance	0.000 ... 1999 MΩcm
Cell constants	Theoretically 1.0 (Provide NISt traceable certificate)
Salinity Range	0.0 to 70.0 (according to IOT)
TDS Range	0 to 1999 mg/l
Temperature	– 5,0 to 105,0 °C ± 0.1 °C
Accuracy Conductivity	± 0.5% of value
Auto Read	automatic/manual selectable
Reference Temperature	Factory set at 25 °C
Temperature compensation	Automatic or switched off
Temperature coefficient	• Non-linear function for natural water to EN 27 888 • Linear compensation from 0.001 ... 2.999%/K • No compensation
Calibration	Upto 3 point with 0.01 mol KCl
Data Output	Digital display
Energy Supply	230 ± 10Volts / 50Hz Ac
Protection Type	IP67to IEC 529
Warranty	3 years comprehensive on instrument & 1 year on electrodes.
Internal Diagnostics	Yes
Splash Proof Housing	Yes
Display	LCD
Simultaneous Temperature Display	Yes
Membrane Keyboard with pressure defined points	Yes

Memory Data Sets	At least 800
GLP Supportes Functions	Yes
Calibration Protocol	Yes
Calibration Interval Selectable 1 …999 Days	Yes
USB Port	Yes
Alarm Functions	Yes
Limit Value Settings	Yes
Sensor Validation	Yes
Certificates	CE/UL/CUL

Electrode Features

Robust unbreakable epoxy body, Highest degree of precision, linearity and large measuring range with just one cell
Long term cell constant stability with high quality abrasion resistant graphite electrodes with built in temperature sensor as standard
Smallest immersion depth possible
No measuring errors even with very dirty electrode –(contact resistance on the electrode surface is automatically compensated) from cable influences, from primary or secondary polarization effects and due to contact with side walls or base of measuring instruments

Electrode Specifications

Electrode Material	Graphite
Shaft Material	Epoxy
Cell Constant	K = 0.475 /cm
Cable Length	3.0 m or more
Measuring Range	1 uS/cm to 2S/cm
Temperature Range	0 …. 100 Deg C
Min./Max. Immersion Depth	36/120 mm

Accessories :

(i) To be supplied complete with carrying case, Electrode, Rechargeable batteries, Operation & service Mannual (Two set).

(ii) NIST traceable reference solution 1000 uS/cm, 1413 uS/cm, 12.9 mS/cm with Certificate.

(iii) The Conductivity meter should be calibrated from NABL accredited laboratory.

Optional :

Buy Back of old conductivity meter option may also be quoted**.**

ITEM CODE NO. 4

ANALYTICAL BALANCE
(SEMI MICRO BALANCE)

Capacity	At least 200 gm or more
Readability	0.01 mg in the range or better
Tarring Facility	Entire range
Repeatability	0.015 mg upto 60 gms. and 0.025mg above 60 gms
Display	LCD /Touch screen display
Calibration adjustment	Built in fully automatic time and temperature controlled adjustment
Linearity	0.1 mg in full scale
Sensitivity Drift	Max. $\pm$ 0.00015 %
Printer	Built in USB Port for printer/ computer
Eccentric load	0.2mg
Settling time	< 3 Sec
Weighing Pan	Grid / Normal (78 x 73 mm)
Draft Shield	Automatic and detachable
Terminal	Display terminal detachable & adjustable
Level control	Level control with warning signal
Protection	User administration & Password protection
Power Supply	Should operate on 230 ± 10 volts, 50 Hz, AC
Calibration Weight Box	Standard calibration weight set 1mg to 200gm of E1 Class traceable to National / International Standards with certificate (only one set for all Balances)

Other Requirement

(i) To be supplied complete with dust cover, Operation & service Manual (Two set),

(ii) Should be calibrated from NABL accredited calibration laboratory and calibration certificate will be provided. This certificate will also be provided during warranty and AMC once in a year.

ITEM CODE NO.5

SPECIFIC ION METER (ION ANALYSER)

TECHNICAL SPECIFICATIONS	
pH measurement	Range 0.000 to 14.000 Resolution: 0.01 or better Relative Accuracy : ± 0.002 Calibration: 3 or 5 point by specific calibration solution Specificity: up to three point from decimal
Ion Concentration measurement	Range: 0.001-19990 Resolution: 1 count Accuracy: ± 0.5
Temperature Measurement	Range: -10 to +140 ^{o}C Resolution: 0.1 ^{o}C ± 0.2 ^{o}C Accuracy : ± 0.1 ^{o}C
Time Recorder	Date and time can be called up and recorded at least 1000 points
Display	Graphic LCD backlit display and feather touch keys.
Printer / Computer connectivity	Should have USB Port for attachment of Printer/ Computer.
Power Supply	9 Volt Line adapter for 230 ± 10 volts, 50 Hz, AC
Ambient conditions	Equipment shall be suitable for operation in ambient temperature *i.e.* 5-50 ^{o}C and relative humidity of 5-85%.
Ion Selective Electrodes	Ion selective electrodes with standard electrolyte solution for measurement of Fluoride, Chloride, Cyanide, Nitrate, Ammonia, and Calcium with at least Two years of shelf life
Spares and consumables	Should be supplied for two years trouble free operation.

Electrodes (Epoxy body combined solid state) & calibration standards :-

Fluoride electrode suitable for range of 0.02 ppm to saturation,
Chloride electrode suitable for range of 1.80 to 35500 ppm to saturation,
Nitrate electrode Combined liquid membrane, suitable for range of 0.1 to 14000 ppm.
Ammonia electrode Combined high performance Gas sensing, suitable for range of 0.02 to 17000 ppm.
Calcium electrode Combined liquid membrane, suitable for range of 0.02 to 40000 ppm.

Cyanide electrode capable to measure Cyanide Sulphide electrode capable to measure Sulphide All electrodes should be supplied alongwith (60 ml X 5 no.s of each) Reference Electrode fill solution Standard solutions NIST certified 500ml (100 ppm for Fluoride, 1000 ppm for Chloride, 1000ppm for Nitrate and 0.1 M for Ammonia and 100 ppm for Calcium)

Accessories :

Should be supplied with Power cord, Dust cover, connecting cable, Power adapter, Operational & Service Manual (Two Copies of each), Electrode Stand (Flexible) Beakers for Calibration.

ITEM CODE NO.06

WATER BATH (THERMOSTATIC)

Technical Specification:

Temperature range	5^{o} above ambient to 100 ^{o}C
Temperature stability :	±0.25 ^{o}C
Temperature uniformity	±0.2 ^{o}C
Temperature Control Primary	PID (Programmable, digital, dual-temperature control)
Secondary (safety control)	Hydraulic thermostat
Temperature sensor	100 Pt RTD Display: LED, ^{0}C/^{0}F switchable
Wetted materials	304 SS
Low-level cutoff	Yes, adjustable\ Bath Capacity: 10 Liters
Bath Opening	10¾" x 11¾" Working depth: 6"
Overall dimension	15" x 8 1/8" x 15½"
Power	230 Volt AC, 50 Hz

ITEM CODE NO.07

UV ¯ VISIBLE SPECTROPHOTOMETER

(PC-Controlled)

Type	The instrument should be double beam with solid state detectors automatic scanning and fully controlled by external PC using Windows based software.
Wavelength range	should cover 190-1100 nm range with full PC controlled and software operating under windows environment.
Wavelength accuracy	± 0.3 nm or better
Wavelength Repeatability	≤ 0.5 nm or better
Light source	Should be Deuterium and Tungsten /Halogen lamp with selectable switching facility.
Band pass range	Variable Bandwidth from 0.5 to 4nm
Scan speed	5 to 3000 nm/min
Photometric drift	0.0003 absorbance units/hour at 340 nm
Power Requirement	230 VAC ± 10V, 50 Hz
Noise Level	Should be 0.00008 A or better.
Computer	PC should be of standard make DELL / HP / Lenovo with 4GB RAM and 500GB hard disk . Latest version with DVD ROM, Licensed software compactable for operation control and monitoring of UV Spectrophotometer and accessory modules printer (HP) Software performing analysis at least as per DIN/ISO/US- EPA, calibration, blank correction, data import, data export, data handing and reporting, quality control protocols, computer based training.
Spare Parts	Essential spare parts for five years of operation, Matching cuvettes (6 pairs). Should provide Dust cover, operation manual Hard copy(Two set) and soft copy.

Other Requirements

(i) The supplier shall do installation, commissioning and impart training on operation and maintenance of system.

(ii) Principal manufacturer will submit the 5 years AMC charges after expiry of three years warranty

(iii) The should be calibrated from NABL accredited calibration laboratory and calibration certificate will be provided.

ITEM CODE NO.08

COD REFLUXER WITH AIR CONDENSERS

COD refluxer will be used for Potassium dichromate - Sulphuric Acid digestion of water / waste water samples.

Capacity	15 samples at a time
Construction	Should be compact and made of SS and should have 15 holes to take reaction vessels, cooling tray and an air cooler stand for 15 air coolers and stand for 15 reaction vessels. The capacity of glass vessels should be 100ml. each with OD 39mm & total length 280 mm. Air Condenser should be of total length 745 mm & OD 39mm
Temperature	$150^{O}C \pm 1\%$ (with digital display provision)
Sample size	20ml. (Total volume 60 ml with Reagents)
Timer	Programmable countdown timer in HH:MM up to 99 hours 59 minutes with 2 hours adjustable timer with buzzer
Glassware	15 reaction vessels along with air condensers. Additional 30 reaction vessels and 15 Air condenser should also be supplied
Accessories	1. SS holder for glass ware handling along with FRP water tank 2. Aluminium stand for reaction vessels 3. Aluminium stand for air condensers Two sets of the above accessories have to be
Display board	Graphic LCD module 128 x 64 dots with big visible fonts and aesthetic soft touch key board.

The Heating block with micro controller programmed should provide a temperature range up to at least $200^{0}C$

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ITEM CODE:09

AUTOCLAVE VERTICAL

Technical Features:

Vertical autoclave with double walled units, with pressure gauge, pressure release valve and stainless steel basket as a standard feature mounted on sturdy legs.

Outer body and inner chamber of autoclave should be made of heavy thick gauge non magnetic stainless steel sheet of SS-304 grade are welded.

Autoclave should be air insulated from inside.

The lid should be constructed of thick stainless steel plate with a double safety radial locking arrangement, foot pedal for easy lifting of lid to ensure smooth opening and closing operation. Sealing of lid through resistant Neoprene rubber gasket

Ergonomic & Energy efficient design

Double Safety Radial Locking Arrangement

Double Safety Valve Protection

Hydraulic Testing Upto 2.5 times the working pressure i.e., 40psi

Calibration And Protocol Documentation

Heating: The heating process of the vertical autoclave should be done through water heaters of suitable wattage to ensure optimum sterilization time in every sterilization cycle.

Working Temperature: As per the international standards and guidelines vertical autoclave should have a working temperature of 121^{O}C.

Range: Ambient to 200^{O}C

Pressure Range: The pressure range is 5 to 30 psi, but it should be tested at 40 psi.

Accuracy $\pm$ 3psi

Pressure Control: The pressure inside vertical autoclave should be controlled through a Microprocessor based PID controller and display .

Safety locking system to prevent opening of lid when chamber is under pressure

Steam Release valve of Stainless Steel to ensure a long life of Autoclave.

High grade spring loaded safety valve of brass, duly chrome plated.

Water Indication Gauge with stainless steel enclosure

High accuracy and reliable pressure gauge.

Lid opening mechanism: Foot operated (Paddle) lift

Low Water Protection Device: The automatic system should be incorporated to give protection against the low water level.

Drainage : Drain pipe with cap

Steam Release : By hand set valve

Digital Temperature Indicator: A solid state digital temperature controller cum indicator should be incorporated for easy monitoring of the temperature of the autoclave from a distance through its large LED display.

Programmable Temperature Controller: A programmable micro processor based temperature controller cum indicator should be incorporated to pre-program the sterilization cycle temperature with high amount of accuracy and reliability

Working Chamber Dimensions (Approx) :

Diameter (mm)	Height (mm)	Volume (Liters)
400 mm	**600 mm**	**At least 70 liters or**

Optional : Buy Back of old Autoclave against the supply may also be quoted.

ITEM CODE :10

BACTERIOLOGICAL INCUBATOR

The incubator should have double walled construction with stainless steel sheet (minimum 75 mm thick) with PUF insulation.

The inner chamber should be made up of SS-316 and outer chamber with SS-304. The door should have double glass viewing window of size adequate enough to permit observation without disturbing thermal condition

A duct at the backside of the inside chamber should have heater and air circulating fan motor.

Heating element should be appropriately located to enable temperature control through built in air circulation fan.

The incubator should have observation door, interior lighting, port hole and safety features.

It should have micro processor based PID controller with digital display and PT-100 sensors with printer interface facility.

The capacity should be approx. 200 ltrs and inner chamber should be 600 mm X 600 mm X 600 mm

The temperature range should be ambient to 70^0 C with an accuracy of $\pm$ 0.2^0 C

It should have adjustable 2-3 shelves, pilot lamp, atleast 3meter power cable & plug.

Power Requirement 230 $\pm$ 10 Volt, 50Hz.

Optional :

Buy Back of old conductivity meter option may also be quoted.

ITEM CODE:11

HOT AIR OVEN

Internal Chamber size	60 X 60 X 60 cm
Mounting	Wheel mounting
Construction	Double wall stainless steel (SS 304) with inside mirror finish and outside chamber dull buff.
Temp.	$5^{O}C$ ambient to $350^{O}C$
Temp. Accuracy	$\pm$ $0.2^{O}C$
Electrical wiring	High quality fire retardant with contractor
Control	Microprocessor based PID controller with digital display and PT-100 sensor .
Rating KW	3 KW
Power Requirement	230 $\pm$ 10 Volt, 50Hz.
No. of shelves	3 nos. adjustable
Safety system	Safety alarm (thermostat)
Quality tests	System should pass IQ / PQ / OQ tests
Accessories	To be provided with Temp. control, digital display of temperature, Power cord (Atleast five meters) and plug
Calibration	Should be calibrated for temperature by NABL Accredited calibration laboratory and calibration certificate to be provided alongwith equipment

ITEM CODE:12

HOT PLATE

The hot plate should be Rectangular in shape and made up with Stainless steel body, thick SS plate (25 mm Or more) which can with stand higher temperature The size of the Hot plate should be 45 cm*60cm*15cm

The rating of Hot plate should be 3000 watts

The Internal heating element should be superior quality and to be provided in shock roof enclosure and assessable easily for maintenance.

Microprocessor based temperature controller is preferred and temperature range should be 100 to 500 ^{o}C with maximum surface temperature of hot plate not less than 300 ^{o}C

Power Requirement 230 $\pm$ 10 Volt, 50Hz.
To be complete with temperature control, Switch, Power cord energy regulator Mains,
spare heating element

ITEM CODE:13

MAGNETIC STIRRER WITH HOT PLATE

Type	Compact with Stainless steel top heating plate
Width	200 to 250mm (Approx)
Depth	250 to 300mm (Approx)
Height	100 to 150mm (Approx)
Speed	Upto 1200 RPM, provided with electronic speed regulator.
Temperature Range	Ambient to 200 ^{0} C
Stirring capacity	Atleast 10 liters (powerful motor of 150 watts motor rating input)
Heating capacity	1000 watts provided with energy regulator
Power	(230$\pm$10) volts/50 Hz AC operated
Accessories	Teflon coated Magnetic stirring bars (cylindrical 12 mm, 25 mm, 35 mm) 10 nos. each

Holding rods supporting rods Boss head clamp

ITEM CODE NO. 14

FLAME PHOTOMETER (DIGITAL)

System for the measurement of alkali and alkaline earth metals (only Sodium and Pottasium) in the environmental samples, should be microprocessor controlled using the technique of flame photometry, comprising of aspirator, oil free compressor, burner filters and photo detector.

Technical Specifications

1.	**Instruments response/sensitivity**	
	Sodium	Upto 100 units for 2 ppm or less
	Potassium	Upto 100 units for 1 ppm or less
	Accuracy & Reproducibility	± 2
2.	Display	Atleast 4 lines alpha numeric LCD read out with record for date and time of analysis.
3.	Detector	Photo conductive cell
4.	Filters	Sodium, Potassium, with automatic filter selection facility
5.	Output	RS.232 interface with printer post facility for hard copy.
6.	Power requirement	230 ± 10V, 50 Hz AC

ITEM CODE NO. 15

DIGITAL COLONY COUNTER (ELECTRONIC)

SPECIFICATIONS

- Digital Colony Counter should have glare-free illumination with 100 mm diameter- magnifying lens the position of which should be adjustable.
- The counting plate should have standard wolf hugle ruling. Should provide automatic digital display (minimum 3 digits), with facility to manually reset.
- Should be complete with ON / OFF switch, probe for counting, power cable with plug.
- Suitable to work on 220 ± 10 volts / 50 ± Hz AC power supply.

ITEM CODE NO. 16

HEATING MANTLE
1KW & 0.5KW

SPECIFICATIONS

Heating Mantle	Made of yarn providing uniform heating of flasks up to 400^0C
Construction	Built In energy regulator, temperature controlled, indicator light fitted in painted metallic box
Holding capacity	Holding capacity for 250ml, 500ml, 1000 ml flask
Power requirement	220 ± 10 volt 50 Hz AC

ITEM CODE NO. 17

ONLINE UNINTERRUPTED POWER SUPPLY (UPS) SYSTEM

Three phase input and single phase output, Castor wheel mounted UPS alongwith automatic Delayed Restoration Device (ADRD) with atleast 4 hours backup in full capacity.

UPS Capacity	**7 kVA**
Make	Reputed make such as Tata Liebert/ Emerson/ APC/ Uniline
Technology	PWM using IGBT/MOSFETS
Crest Factor	More than 3:1
Input (Three phase):	
Voltage	415 V AC
Voltage Range	± 25 V
Frequency	50 ± 3% Hz
Output (Single Phase):	
Voltage	220 V AC
Voltage Range	± 10 V
Frequency	50 Hz
Regulation waveform	Pure sine wave
Batteries:	
Battery Type	Sealed maintenance free lead acid long life batteries
Batteries Expected Life	Minimum 5 years or more
Battery Numbers	Depends upon capacity of UPS and backup time. Quote may be made on per battery basis mentioning nos. of batteries required in the battery bank attached with UPS.
Battery Bank Housing	Fully enclosed mild steel Almirah type housing with castor wheels and wheel locking

	facility.
Backup Time	4 Hrs (full load) or more
Battery Capacity	Depends upon backup time, may be quoted
Recharge Time	5 hrs to 90% after complete discharge
Distortion	Less than 1% linear load
Power Factor	0.9 to 1.0
Indicators Display	L.E.D. Battery charge, Load Level, Online, Over load, On battery, Replace battery
Alarm	Audible alarm for battery backup, battery low and fault
Protections:	
Surge	Surge suppression meets BIS or International Standard
Overload	Fuse & Current limited
Short circuit	Fuse & Current limited & Cut off
Battery low Cut-Off	No battery drain after cut-off
Overload Capacity	110% for continuous load
Efficiency	More than 90%
Environment:	
Operating Temperature	Ambient to 50^0C
Operating Humidity	10% to 95% (Non condensing)
Audible Noise	Less than 45 dB (at 1 meter)
Floor area occupied by UPS	Should not be more than 1000 X 1000 mm

ITEM CODE NO. 18

COMBUSTION GAS ANALYSER
(Flue Gas Analyser)

1.	Gases to be measured	CO, O_2, CO_2, SO_2, NO, NO_2, HC and combustion efficiency
2.	Sensors	IR or Electro-Chemical Sensors with high accuracy and life span of 3 to 5 years
3.	Gas Flow	1 to 2.5 litre /min
4.	Temperature Measurable	600^0 C
5.	Operating Temperature	0-50^0C
6.	Power Supply	Battery operated along-with built in charger on mains 230 V $\pm$ 10 VAC, 50 Hz $\pm$ 3%
7.	Flue Gas Probe	Stainless Steel Shaft with rubber handle
8.	Pre Programming	For Natural Gas, light Oil, heavy Oil, LPGs, Propane, Butane, Coke, Coal etc.
9.	Parameter wise Specification	Please see Annexure - 'A
10.	Software/Operator	Easy to handle Key Board operated and user friendly. Data format transferable to user software.
11.	Weight	Light Weight / Portable
12.	Certificate	Calibration and certificate of approval from recognized agency like EPA, TUV be provided.
13.	Documents	Instruction manual for operation. Circuit details for each electronic card for repair and maintenance.

Annexure "A"

Parameter	Resolution	Accuracy	Range
Temperature Measurement Flue Temperature	0.1^0 (C/F)	0.1^0C ± 0.3% of reading	0.10C use high temperature probe gases > 600^0 C/1112^0F
Inlet Temperature **Gas Measurement** Oxygen (O_2)	0.1^0 (C/F) 0.1 %	0.1^0C ± 0.3% of reading -0.1% + 0.2 %	0 – 600^0 C 0 – 25 %
Carbon Monoxide (CO)	1 ppm	± 20 ppm < 400 ppm 5 % of reading < 2000 ppm ± 10 % of reading > 2000 ppm	0 – 10,000 ppm
Carbon Monoxide (CO)	0.01 %	± 5% of reading from 0.1 % to 10%	0 – 10 %
Nitric Oxide (NO)	1 ppm	± 5 ppm <100 ppm ± 5% of reading >100 ppm	0 – 5,000 ppm
Nitrogen dioxide (NO_2)	1 ppm	± 5 ppm <100 ppm ± 5 ppm <100 ppm	0 – 1,000 ppm
Nitrogen dioxide (NO_2)	5 ppm	± 10 ppm <500 ppm ± 5% of reading >500 ppm	0 – 10,000 ppm
Sulphur dioxide (SO_2)	1 ppm	± 5% of reading >100 ppm	0 – 10,000 ppm
Pressure	0.01 mbar/kpa	± 0.05% full scale	0 – 150 mbar
Carbon dioxide (CO_2)	0.1%	± 0 %	0 – Fuel Value
Efficiency	0.1%	± 1 %	0 – 100 %
Hydrocarbon (HC)	0.01	± 5% of reading	0 – 10,000 ppm

ITEM CODE NO.19

BOD INCUBATOR

Specifications

Microprocessor PID control / Auto-tuning / Calibration with shell level adjusters, digital LED display (0.1^0C resolution) using touch sensation key pads, forced air convention with an optimal, cross flow type fan to maintain excellent temperature uniformity inside the incubator and fan speed can be controlled in three steps, optimized sample inspection through tempered inner glass door without affecting chamber temperature, over temperature limiter and door opening alarm, nine steps of temperature profiles programmable, three different temperature memorable.

Chamber Volume	244 liters
Temperature Range	0^0 to 60^0C
Temperature accuracy	+ 0.1^0C
Digital timer	1 minute to 99 hr 59 minutes
Refrigerator	1/6 Hp (HBP compressor)
Material	Internal – stainless steel (0.6 t); External – Steel (0.8t power coating)
Shelves	Stainless Steel wire, electro polished and separable
Number of shelves	Three
Safety device	CLS (custom logical safe) – control system
Print Interface	RS 232

ITEM CODE NO. 20

MICROWAVE DIGESTER

Specifications:

The System must have a microwave power output of atleast 1400 watts , delivered from 2 magnetrons for homogeneous heating.

Microwave system must deliver un-pulsed Microwave energy output over the whole power range of 1400 Watts for precise reaction control.

Cavity volume must be 66 Liters or more to accommodate various accessories.

System must have built-in high performance vessel cooling system. The airflow must be directed through air-guides around the vessels. Air-flow should be variable and controlled by system software.

To ensure user safety during handling, vessels must be cooled inside the oven. Removal of hot, pressurized vessels and the use of external cooling devices like water baths is not acceptable.

System must have built –in control and graphic display for all routine operations. It should have possibility of connection with an external PC to view the process.

Should be quoted with Software to interface with external PC.

Should have possibility to store, modify and recall custom programmes for process runs.

Should have provision for in built pressure filtration for easy processing after leaching runs.

Rotor system

System must be capable of processing 16 reaction vessels simultaneously.

Should have provision for magnetic stirrer in each vessel position.

Sensor System
Pressure sensor should be able to measure the pressure increase rate and provide feedback to instrument electronics to control exothermic reactions in their initial stage (quote optionally).

Should have IR temperature sensor for remote/non-invasive measurement of temperature.

Vessel Specifications
Volume : 100 ml (as per EPA 3015A)

Maximum Pressure: 70 bar(1000 psi) or more

Max Operation Temperature: 200 deg C or more

Material Design Pressure : 140 bar(2000psi) or more

Max. temperature and pressure specifications must be available at the same time.

1. All vessels should have simple hand tightening closure. No special tools must be required to close the vessels.
2. Reaction vessel must have reliable metal safety disks for overpressure protection. Operation via self venting is not acceptable to prevent contamination and escape of gases.
3. Reaction vessel must be vent able prior to removal and opening of the rotor to prevent chemical and pressure hazards.
4. Each pressure vessels must be individually tested & deliverance with pressure test certificate.
5.

Safety Features

System must have (magnetically) resealing safety door for safe release of overpressure.

Multiple Over pressure release Devices

Protection shields on rotors and Vessels.

Certified Safety System

Additional Accessories

Drying rotor with capacity more than 4 ltrs for microwave assisted fast and carbonization free drying of samples should be quoted optionally.

ITEM CODE NO. 21

MUFFLE FURNACE (Digital)

Furnace has muffle wound externally with heating unit upto the max temperature of l000'C and of the specifications are as follows:

Chamber size	450 x 230 x 230 mm
Material	Steel in and outside, ceramic fibre insulation
Door	Opening & closing with heat proof handle Exhaust fume exit provision.
Temp. range	300 to1000^{0}C
Temp. setting	Thermostatically controlled upto 1000^{0}C at 1000^{0}C ±10^{0}C accuracy single set point control rise time (to1000^{0}C) less than 1 hour embedded heating elements on three sides
Temp. reading	read set temperature on indicating pyrometers calibrated in 20^{0}C measurements in the entire range displayed digitally.
Power	230 ± 10V/50 Hz AC
Watt	3000
Features	Highly insulated Pilot lamp for thermostat operation Drop down door with high quality hinges (to serve as shelf during (un)loading samples) Safety interlock switch for open door

ITEM CODE No. 22

AMBIENT CARBON MONOXIDE (CO) ANALYZER

Conforming to USEPA Automated Federal Reference Method (FRM) Designation

01.	principle	Non dispersive Infra-Red (NDIR) with Gas Filter Correlation
02.	Measurement	Carbon monoxide in Ambient Air
03.	Display	Digital
04.	Ranges	At least four ranges Auto ranging 0-100 PPM
05.	Minimum Detectable limit	0.1 PPM
06.	Zero Noise	0.05 PPM with time constant $\pm$ 30 sec
07.	Zero Drift	< 0.2 PPM/7 days
08.	Span Drift	< 1% full scale in 24 hrs.
09.	Calibration	Calibration gas (CO) cylinder – 47 lit. and portable one each with known concentration has to be provided along with the instrument for calibration purpose. It should also have pressure gas valve for Zero and span gas.
10.	Consumables and spares	Recommended requirements of 5 years of continuous operation.

ITEM CODE NO. 23

AMBIENT SULPHUR DIOXIDE (SO_2) ANALYZER

Conforming to USEPA Automated Federal Equivalent Method (FEM) Designation

01.	Principal	Pulsed UV Fluorescence
02.	Measurement	Sulphur Dioxide in Ambient Air
03.	Lower Detectable limit	1 PPB
04.	Ranges	Auto ranging 500 PPB
05.	Display	Digital
06.	Noise Level	0.50 PPB or 1%of the reading
07.	Zero Drift	< 1 PPB/24 Hrs with automatic zero compensation
08.	Span Drift	< 2 PPB full scale in 15 days
09.	Calibration	Please see calibration section
10.	Consumables and spares	Recommended requirements of 5 years of continuous operation.

ITEM CODE NO. 24

AMBIENT OXIDES OF NITROGEN (NO_x) ANALYZER

Conforming to USEPA Automated Federal Reference Method (FRM) Designation

01.	Principle	Chemiluminescence
02.	Measurement	NO-NO_2-NO_X in Ambient Air
03.	Display	Digital
04.	Ranges	Auto ranging 0-2000 PPB.
05.	Minimum Detectable Limit	1 PPB
06.	Noise Level	0.5 PPB
07.	Zero Drift	< 1 PPB/24 Hrs.
08.	Span Drift	< 2% in 15 days of full scale
09.	Response Time	30 seconds or earlier
10.	Linearity	$\pm$ 1% of full scale
11.0	Calibration	Please see calibration section
12.0	Consumables and spares	Recommended requirements of 5 years of continuous operation.

ITEM CODE NO. 25

AMBIENT OZONE (O_3) ANALYSER (Conforming to USEPA Automated Federal Reference Method (FRM) Design)

Principle	UV Photometric
Measurement	Ozone in Ambient Air
Display	Digital
Range	Auto ranging 0-500 PPB
Minimum Detectable Limit	1.0PPB
Noise	Lessthan±1.0PPB
Zero Drift	< ½% per month
Span Drift	<1% per month
Flow Rate	1-3 Liters/ Minute
Calibration	Please see calibration section in general specification
Consumables and spares	Recommended requirements of 3years operation
Linearity	Continuous ± 1%!
Analog Output	0-1V, 0-10V, 0-20mA, 4-20mA
Digital Output	Multi drop RS 232 port

DATA ACQUISITION SYSTEM

The data Acquisition System (DAS) should be able to collect and store meteorological data and air quality data from all instruments listed above. The DAS should be data logger designed to acquire, transmit, process and store data. DAS should include following minimum features:

- "Industry Standard" RS232 Communication enabling digital/analog communication with all supported monitoring and meteorological equipment.
- Supports remote communication through radio, switched telephone, cellular telephone, as well as short haul modems. Capable to send SMS message to Cellular dives for location-specific or in the event of fault or incase of data limitation error.
- Data storage space for minimum 30 days of 5 minute historical data
- Captures minimum, maximum, average values and standard deviations.
- Lighting & surge protection facilities.
- Full control over calibration cycle periods.
- Password Protection.
- DAS should be designed for unattended use.
- DAS should have 6 to 8 line of fully pixilated graphic display (LCD) for data & set-up parameters to be viewed .

ANALYTICAL SOFTWARE

The supplier should provide Windows XP or latest software based for data acquisition from the DAS and for statistical analysis and reporting of the monitored parameters mentioned above. Analysis and reporting software should posses following minimum features:

- Windows XP or latest compatible.
- File format conversation.
- Statistical analysis of data for maximum, minimum, average and standard deviation for various time intervals using the monitored data.
- Tabular and graphical format for report production.
- Wind rose graphs.
- File export facility.
- Windows based printer support.

COMPUTER SPECIFICATIONS

Make	: IBM compatible HP
Core 2 Duo processor	
RAM	: 2 GB
Hard disk	: 320 GB
CD ROM/write/Combo	: as per latest configuration
Monitor	: 40" LCD panel
Port	: 2 Serial, 1 parallel & 4 USB with LAN
Keyboard	Multimedia
Mouse	: optical Mouse + Pad
Software	: Windows XP / latest version compatible with DAS

SPECIFICATIONS OF COLOUR LASER PRINTER

Colour Laser Jet Printer make HP

TECHNICAL SPECIFICATIONS

4.0 GENERAL SPECIFICATIONS FOR ALL ANALYSERS

4.1 The analysers should be 19" rack mounting model with facilities for fixing the analysers from front side.

4.2 The ON / OFF switch and display of the entire important status single viz Sample flow, temperature, concentration, range switch, manual / auto modezero / span mode should be on front panel.

4.3 The analysers should operate at operating voltage 230 volts $\pm$ 10 volts AC and 50 Hz $\pm$ 3%. The power supply input to protected against spikes from and to the analyser by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian main socket.

4.4 The analysers must function properly in Indian conditions without any defect between 0-50^{o} C ambient temperature, 10-95% relative humidity and in high ambient dust levels. The data capture rate should not be less then 85%. or better.

4.5 The Manufacturer shall provide minimum of 2 weeks of operational & preventive maintenance hands-on training for at least two person at the installation site.

4.6 The analysers should be complete with calibration system. The calibration system should be delivered along-with respective span gas cylinder / permeation tubes. The span gas concentration should be within 60-90%of first measuring range. The analyser must have zero point internal calibration system and in agreement with minimum detection limit of eachanalyser. The calibration procedures are to integrated into the software system for automatic calibration.

4.7 The permeation tube and the calibration gases provided with the system shall have tractability to NIST.

4.8 The analysers shall be supplied with all ancillaries necessary for operation including external pump (if any) and any other items such as charcoal scrubber, Teflon air sampling intake filter, drier, Teflon tubing suitable for connection to air sampling manifold. All such items are to be itemised. Dust filter in all the analysers should be provided before solenoid valve to protect frequent chocking of solenoid valve.

4.9 The connector systems for out going signal for recording and the computer terminal should be on back panel with screw type connecting pins.

4.10 All ambient gas analysers shall conform with the USEPA automated reference or equivalent method designation as required by the specification for individual equipment. All analysers shall be micro-processor controlled with automatic calibration using an external dilution calibrator and calibration standards. All analysers and sensors should be fully inte -grated in the rack cabinet, fully calibrated & tested before supply and ready for start-up at the respective sites. Analyser must exhibit performance equal to or better than values specified in the specifications.

4.11 The manufacture shall provided 03 years warranty for the entire system. Annual Maintenance charges and Comprehensive maintenance charges for the entire system after the warranty period should be specified.

4.12 The manufacture shall provide price list of the spares and ensure their availability for the next at least 8 years beyond the warranty period.

4.13 The manufacturer shall specify the cross sensitivity of measurement for all the analysers.

4.14 Each set of analysers shall be supplied with two copies of elaborate operation manuals comprising details in three parts:

Parts (i) should comprise installation, operational and trouble shooting details:

Parts (ii) should have details about preventive, routine and corrective maintenance ; and

Parts (iii) should comprise details of all electrical, electronic and pneumatic circuit diagram, details of each spare parts, catalogue No. etc. and details of each electronic card / PCB's.

Parts (iv) Schematic diagram for possible repair & maintenance.

4.15 Digital Output

Multi drop RS 232 port shared between analyser and computer for data status and control.

ITEM CODE NO. 26

MULTICALIBRATION SYSTEM

Gas Calibration System

The calibration system for air monitoring equipment (CO, O_3, SO_2, NO_X Analyzers) should incorporate an automatic gas dilution calibration gas standards and a high performance zero air generator to calibrate all of the analyzers in the system. The calibration cycle should be able to be configured through the data Acquisition System at any specific time during the day or night. It should be mounted on standard 19" rack.

The dilution calibrator should be able to perform mixing of source gas, from the calibration gas bottles, with zero air generator, in order to generate a wide range of calibration gas concentrations and minimizing the number of calibration gas standards required. All the calibration gases provided along with the system MUST be NIST traceable. The system should include at least three permeation chambers and should accept a Permeation Tube up to 11 cm in total length and 2 cm in diameter. It should also have facility for Gas Phase titration (GPT), having Ozone generator of 6 PPM / Ltrs. And the converter efficiency should be 100% for conversion of NO_2 concentration to NO.

The system should also include calibration of Ozone analyzer.

ITEM CODE:27

ATOMIC ABSORPTION SPECTROPHOTOMETER (AAS)

Computer controlled AAS with built-in flame atomic emission / Zeeman graphite furnace mode. The whole system should consist of basic unit for flame (air & acetylene, N_2O & Acetylene), AA operation, mercury hydride system, graphite tube atomizer, auto samplers, auto diluters & all related software with necessary spares and consumables. The system should have facility software control from flame to furnace.

Features:

The system should be double beam AAS operating in the 185 - 900 nm wavelength range and giving a sensitivity of at least 0.9 abs for 5 µg/ml with RSD less than 0.5% within 5 Sec (time) measurement aqueous copper standard solution with air-acetylene flame.

The system should have absorption & emission capabilities.

The parameters like slit width, lamp current, gas flow, etc have to be controlled through computer.

Should have a visible display of the detectorís energy gain in some form convenient to the operator, simultaneous background correction (deuterium & zeeman) with attenuator,

It should have provision for automatic calibration using at-least up to six (6) standards and recalibration with single standard, and should operate on 220 $\pm$ 10 Volts, 50Hz AC power supply.

The flame and graphite furnace system should be integrated preferably in one spectrophotometer and easy switching operation from one mode to another should be fully computer controlled. Flipping from one mode to other should not disturb the optical alignment at all.

No mechanical atomizer changeover mechanism so as to get good reproducibility & alignment.

Methods should be able to run sequentially in each sample compartment as a dual analysis.

Auto-sampler should be permanently aligned & installed with the furnace.

Composition

Atomic Absorption Spectrophotometer (Flame)	1 set
Graphite tube atomizer (GTA) and auto sampler for GTA	1 set
Hydride vapor generator	1 set
Auto dilutor	1 set
High temperature burner head	1 set
Data processing / auto control system	1 set
Hollow cathode lamp for Al, Sb, As, B, Cd, Cr, Co, Cu, Fe, Pb, Sb, Mn, Hg, Ca, Ni, Se, Si, Ti, Zn, Be, V, Mo, Li, Sn	1 Each
Automatic cooling water circulation system	1 set
Necessary accessories for above system	1 set

Technical Specifications Photometric System: Double Beam real time shared optics, long term stability to withstand thermal and mechanical variations. Dual blazed / holographic monochromator of at least 250 mm focal length and 1800 lines/mm or more, spectral band pass should be between 0.1nm to 2.0 nm for effective measurements of all environmentally relevant metals and reduced height should be available for all the slit widths.	
1. Wavelength range:	185 to 900 nm.
2. Band width:	0.1nm to 2.0 nm
3. Monochromator / grating:	1800 lines / mm or Echelle grating blazed at 250 nm. Automated self calibrating monochromator mechanism with micro stepping device for enhanced resolution.
4. Focal length	250 nm or above
5. Wave length repeatability	$\pm$ 0.035nm
6. Monochromator	Cherny Turner or equivalent
7. Resolution	Better than 0.3nm.
8. Baseline stability	0.05 abs per 30 min.
9. Reciprocal Linear Dispersion (RLD)	0.5 nm/mm or less at 200nm.
Lamp mount	
Number of Lamps	Minimum 6 lamps per turret with automatic control
Background correction	Deuterium (D_2) & Zeeman based. The D_2 background correction should be fast enough to take 200 readings / sec. & Zeeman background correction system should also be available in the same instrument to correct stpectral backgrounds.
Optical axis adjustment	Automatic for all lamp positions with six lamp turret based.
Type of Lamp	Cable less Hollow cathode lamp (HCL)
Flame atomization system: Burner / Flame Atomizer (Air-Acetylene and Nitrous Oxide-Acetylene system): (C_2H_2-Air & N_2O -Acetylene). All titanium or equivalent with impact bead and flow spoiler, and should remain unaffected from attacks by acid solutions and organic solvents (eg. Methyl isobutyl Ketone, ie, MIBK). The burner head adjustment in vertical and horizontal direction should be computer controlled and the position of the burner head should also get stored with a defined and particular method. The nebulizer should be able to provide manually adjustable uptake rates, and the material of the nebulizer & related venturi should be inert to acid solutions and organic solvents, such as MIBK.	
Burner type:	
Burner Head	Fully Titanium or equivalent
Nebulizer	Corrosion resistance. Platinum / Iridium / Tantalum venturi for resistance to acid attack.

Spray chamber	Polypropylene mixing spray chamber of pre-mix design
Burner adjustment	Automatic motorized height adjustment of the burner and furnace head.
Flame Control type:	
Flame Control	a. Computer controlled & programmed oxidant selection with automatic gas sequencing and oxidant & fuel monitoring. b. Advanced binary gas control system will be preferred due to less maintenance. c. Essential safety interlocks: mains voltage, burner type as well as its presence in position, air selector, flame sensor, liquid trap level, flash back, gas supply pressure, air supply and gas leak any where in the network of gas tubings in the system. d. Provision for safe and automatic shutdown in case of power failure.
Guaranteed performance	Absorbance >0.9 for 5 µg/ml Copper and RSD <0.5. Working absorbance up to 3 ABS.
Detector	
Photomultiplier Tube based detector with high sensitivity for maximum signal to noise performance. There should not be any kind of cooling required for the detector.	
Graphite furnace:	
Should be a transverse longitudnal heated graphite furnace. Consisting of stabilized temperature / total pyrolytic graphite platform. Provision of two gas supplies (program selectable) with independent control over the gas supply through the furnace. Heating rate of at least 2000^{O}C per second, cooling time 20 seconds, temperature range - ambient to 3000^{O}C or more in 1^{O}C increments. Appropriate feed back system for furnace temperature control, interlocks for water, gas, temperature, furnace door, graphite tube damage & mains power. At least 8 steps or more temperature programming facility with flexibility of programming selection, ramp time, gases, gas flow and read trigger for each temperature step. Transverse Zeeman magnetic field with longitudinal heating for universal temperature over the graphite tube. There should be a circulating water cooling unit supplied from manufacturer to take care of the furnace cooling water requirements. There should not be any discharge of water from this water circulation unit. The machine should be factory-aligned in both flame and graphite furnace modes and the change-over from flame to graphite furnace and back should be automatic operation without hampering the alignment in both mode	

Should be operated at 230 ±10 V, 50 Hz AC with protection for overload. Graphite Furnace Imaging system: The system should have facility for observing sample injection through graphite television operation. The image should be available on the computer screen & the video image should be able to store for future need.	
Auto Sampler for Graphite tube atomizer (Furnace) :	Permanently mounted graphite furnace auto sampler. No need to remove & re-align auto sampler while changeover from flame to furnace. The furnace auto sampler should hold up to 50 samples or more, 10 pre-mix standards and stock solutions for auto mixing, auxiliary modifiers, programmable dispensing volume 1 to 100ml, auto mixing of standards, auto injection of modifiers, multiple injection for pre-concentration, automatic re-slope, auto re-calibration, check sample and spike recoveries,
Hydride Vapor Generator	Automatic continuous flow hydride vapour generator. Should provide a precision of 1% RSD or better. The absorption cell should be of a closed cell design. Should be capable of estimation of mercury by cold vapor technique. Separate flow channel and quartz cell to be provided for mercury and other hydrides. Should be equipped with provisions for online pre-concentration. Preference will be given if facility for un-attended hydride analysis by using electro thermal temperature controller. Gold Amalgamation mercury trapping accessory for use with hydride generator for ppt level analysis of mercury.
High dissolved solid analyzer	For analysis of high dissolved solid solutions of up to 30% weight / volume.
Auto Dilutor:	
Auto Dilutor	In line auto dilutor capable of dilution up to at least 1:100. Should be intelligent to take care in case of standard or over-ranged samples. Capable of being operated on line with the auto-sampler for flame. Auto calibration Auto rinsing after each determination

	Pump should be free from being contaminated by sample or diluent. By-pass for normal flame mode.
Air compressor (with Air filter and oil free filter unit):	
a. The system should be noise free, complete with pressure regulator, necessary tubing and connectors, and should meet the air-supply requirements of AAS operation. The operation of the air service unit or compressor should be quiet in operation. It should include an oil-free pump and should be provided with moisture trap. The unit should be resistant to acidic vapors and the drain valve (if any) should be made of stainless steel or equivalent corrosion resistant materials. In case having built-in reservoir, the hold-up capacity (water) of the reservoir should be 30 liters or more .	
Data processing / automatic control system:	
Application Software	Windows based software Software for flame AA and graphite furnace (air - acetylene) and nitrous oxide-acetylene and (mercury hydride systems) Calibration curve and standard addition methods. Necessary modules to set, run and monitor all the accessories attached to the main unit. Built in self-diagnostics for performance verification. The software should have the following features: -Use interface, methods and sequences, calibration graph, measurement modes, sampling modes, pre-emptive sampling, smart rinse, weight and volume and internal standards corrections, blank and calibration corrections, QC Protocols, data display, data handling, import/export facility, reporting, LIMS support. Should offer IQ,OQ,PQ Certification
Online UPS	Online UPS with 15 KVA with AMF batteries ; 30 minutes backup
Accessories	
Manufacturer's standard accessories	1 set
N_2O gas cylinder (47L) with gas and stainless steel regulator (two stage) with heater, necessary tubings and connectors. The heater should work on 220 $\pm$10 V, 50 Hz AC	1 gas cylinder and 2 regulator (two stage)
C_2H_2 gas cylinder with gas (47L) and stainless steel regulator (two stage)	1 gas cylinder and 2 regulator (two stage)

and necessary tubings and connectors.	
Argon gas Cylinder with gas and stainless steel regulator (two stage) and necessary tubings and connectors	1 gas cylinder and 2 regulator (two stage)
Air acetylene filter assembly	Should include filter for both compressor air and acetylene to remove oils, water, solids up to 99.99% at 0.1 microns. Should remove acetone droplets from acetylene Should have flash back arrester for acetylene
Reference Standard 1000 mg/l. 100 ml	One No. each of Al, Sb, As, B, Cd, Cr, Co, Cu, Fe, Pb, Sb, Mn, Hg, Ca, Ni, Se, Si, Ti, Zn, Be, V, Mo, Li, Sn (NIST or equilant certified reference standards)
Quarts cell / holder	1 set
Blower, bent assembly	1 set
Spare Parts & Consumable	All spares and consumables required for two years maintenance free running of the instrument should be provided. (list of spares & consumables may be provided).
Nebulizer capillary tubing	1 set
Pyro coated type graphite tubes with integrated platform.	200 pieces
Fume Hood	Stainless Steel withappropriat duct dimension along with hood and corrosion / acid proof centrifugal exhaust

SPECIFICATIONS OF COMPUTER (MINIMUM CONFIGURATION)

Make: Standard make viz HP/DELL/Lenovo

Pentium IV	Intel-IV processor 3.0 GHz Original mother board
RAM	4 GB DDR RAM Up-gradable up to 8.0GB
Hard disk	500 GB ultra DMA or higher
FDD:	1.44 MB 3.5”
CD Writer	Combo drive, Internal, latest model
Monitor:	19” LCD / TFT
Port:	4 bays (2 external & 2 internal) 2serial, 1 parallel & 3 USB with LAN 1PS,2 mouse port.
Keyboard:	Latest multi media (Microsoft)
Mouse:	Optical / Scroll Mouse + Pad

Software:	Windows XP professional (latest version) with media documentation and certificate of authenticity alongwith CD,
Anti Virus:	Norton, , Quickheal or equivalent antivirus (Latest Version)
DVD & CD Writer:	DVD ROM and CDRW combo drive max speed 48X24X 24 Internal, or latest model
Network Card	Network card with remote booting facility
: .Energy star compliance, screen blinking, hard disk and system idle mode in power on, set up password power supply surge protected,	

(k) SPECIFICATION OF COLOR LASER PRINTER

15. Speed (pages per minute)	At least 12
16. Resolution	1200 x 1200 dpi
17. RAM 8 MB expandable to 32 MB	
18. Main tray Capacity	At least 250 sheets
19. Interface Parallel & USB	
20. Operating System	Windows 2000, XP
21. Power supply	230±10VAC,50 Hz,

Training:

Training must be in three stages:.

Stage-1: Theoretical training regarding principle, operation and maintenance at Board Office.

Stage-2: Training on operation and maintenance at RPCB, Patna for seven days at the time of installation.

Stage-3: Training for minimum two officials of Board at Principals place in India for a 10 days for the analysis & sample preparation for all elements who's Hollow Cathode Lamps are being purchased

Note: Factory trained engineer has to be arranged for giving training to BSPCB staff. This factory trained engineer or supplier should be continued with supplying company for at least six years.

Please quote rates separately for all standards, spares and consumables required for 3 years (with detailed break-up) along with Annual Maintenance Contract (AMC) charges after expiry of warranty.

Note:	The supplier should enclose the technical compliance statements against our technical specifications clearly mentioning for each point. The statement should be supported by relevant literature/data.

ITEM CODE NO. 28

Mercury Analyzer

SPECIFICATION

1.	Measuring range in solutions	20-200 ng absolute (with small reaction vessel)
		20-600 ng absolute (with BOD bottle as reaction vessel)
2.	Sensitivity	3 ng absolute for 1% absorption
3.	Detection limit	20 ng absolute or 0.0001 ppm (0.1ug/litre)
4.	Short term fluctuations	$\pm$ 1% of F.S.
5.	Vapour generation system	All glass reaction assembly(including BOD bottle)
6.	Readout	2 1/2 DIGIT display
7.	Radiation source	Mercury lamp
8.	Detector	Silicon photo detector
9.	Power requirements	230V, 50 Hz/40VA
10.	Dimensions	510W x 240H x 350Dmn

ITEM CODE NO. 29

CO/HC Analyzer

TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATIONS FOR CO/HC ANALYSERS

Sl. No.	Particulars	Parameters	Specifications
1	Measurement Range	CO	0 to 15 % Vol
		HC	0 to 30000 ppm Vol (Propane) 0 to 15000 ppm n-hexane equivalent
		CO_2	0 to 20 % Vol
		O_2	0 to 25 % Vol
2	Warm up Period		< 10 min
3	Resolution of indication	CO	0.01 % Vol
		HC	1 ppm Vol
		CO_2	0.01 % Vol
		O_2	0.01 % Vol
4	Maximum Permissible Intrinsic errors	CO	Absolute $\pm$ 0.06 % vol Relative $\pm$ 3 % whichever is greater
		HC	Absolute $\pm$ 12 ppm vol. Relative $\pm$ 5% whichever is greater
		CO_2	Absolute $\pm$ 0.4 % vol. Relative $\pm$ 4 % whichever is greater
		O_2	Absolute $\pm$ 0.1 % vol Relative $\pm$ 3 % whichever is greater
5.	Rated Operational Conditions	Temperature	$5^{O}C$ to $45^{O}C$
		Relative Humidity	up to 90%
		Atmospheric Pressure	860 hPa to 1060 hPa
		Mains voltage variation	15% to +10% of nominal voltage
6	Display		20 character x 4-Line backlit LCD display (9mm character size) for night and day visibility.
7	Key Board		Membrane Key Pad 18 keys
8	Power Supply	Range	90 - 250 V AC 11 - 12 V DC
9	Response Time		< 15 sec
10	Printer		A printer shall be provided to print all the data.
11	Calibration		The instrument should have calibration facility.

ITEM CODE NO. 30

Smoke Meter Specifications

Sl. No.	Particulars	Specifications
1	Display	The Smoke meter shall indicate Light Absorption Coefficient 'K' directly and shall have peak hold facility to display/print the maximum smoke reading during free accelerations test.
2	Scale	0 to 6 /meter for light absorption coefficient 'K' with resolution of at least 0.1/meter between the range of 0 to 4/meter.
3	Linearity	$\pm$ 0.1 /meter
4	Drift	The instrument zero drift and span drift with neutral density filter having value between 1.5 to 2.5/meter, shall not exceed $\pm$ 0.1/meter for 4 hrs warming up.
5	Repeatability	Shall not exceed $\pm$ 0.1/meter during five successive calibration test with neutral density filter having value between 1.5 to 2.5/meter.
6	Light Source	Incandescent lamp with a colour temperature in the range 2800 to 3250 K or Green Light Emitting Diode (LED) with a spectral peak between 550 and 570 nm.
7	Light Detector	Photo Cell or Photo Diode (with filter if necessary).
8	Physical Response Time	< 0.4 Sec
9	Electrical Response Time	< 1.1 Sec (90 % of full scale deflection).
10	Warm up Time	< 15 min after power on.
11	Operating Temperature Range	5 to 50 Deg. C(278 K to 323 K).
12	Power	230 V $\pm$ 10 %
13	Engine Speed Measurement System	With an easily attachable speed sensor. The speed measurement range shall be minimum from 200 to 6000 rpm. with Resolution of 10 rpm and Accuracy $\pm$ 20 rpm or $\pm$ 2 & of reading
14	Oil Temperature Measurement System	Shall have measurement range of atleast 0 to 150^{O} C with Resolution of 1^{O}C and Accuracy $\pm$ 3^{O}C .
15	Computer Controlled Operation	via RS232 interface
16	Probe	Min 2 meter length & internal diameter not less than 2.25 cm
17	Printer	A printer shall be provided to print all the

		smoke readings and mean of valid smoke readings along with measured oil temperature and maximum no load speed when tested for free acceleration test, average no load speed, date and time of test etc. vehicle regd. no. etc.
18	Heating Arrangements	The instruments shall have heating facility to avoid condensation in the smoke chamber.
19	Calibration	The instruments shall have facility to adjust zero reading when smoke meter is field is clean air. Smoke meter shall be supplied with a neutral density filter of non value to accuracy of $\pm$ 0.05 /meter light absorption (along with calibration certificate in the region of 1.5 to 2.5 /meter).
20	Correlation to Reference Smoke Meter	The meter shall be correctable for the full load and free acceleration tests or only free acceleration test depending on intended use of the smoke meter with the reference standard meter meeting ECE regulation 24 requirements.

ITEM CODE NO. 31

Micro Processor Controlled Specific Colorimeter

Specification for Colorimeter

Wavelength(nm)	420,520,540,560,580,610
Wavelength Accuracy	±2nm
Wavelength Selection	Automatic
Photometric Range	0 to 2A
Source Lamp	Light emitting diode(LED)
Detector	Photodiode
Display	Custom LCD
Unit	mg/L, ppm, µg/L, absorbance or % transmittance
Low Battery Indicator	Yes
RS232	Bidirectional
Software Features	
Programmed Methods	Up to 190 and 10 user defined
Data logging	100 points
Built-in Timer	Yes
Zero	Yes
Standby Mode	Yes
Capability for Downloading of New Methods Electrical Features	Yes
Power	Four AA batteries
Battery Life	2500 hours(Alkaline);10000 hours(Lithium)
Non Volatile Memory	Yes
Environmental Conditions	
Operating Temperature Range	0^0 to 45^0C
Humidity	90% at 50.0^0C max
Waterproof	IP67
Inputs	Keypad 12 dual function keys with tactile Feedback
RS232	Yes
Sample Chamber	24mm, 16mm and 13mm
Auto-Test*Recognition	13mm ampoules only